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**CAHFS Accession #:** [redacted]
**Addendum Version 1**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/18/2019 4:54:47PM

**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:** 01/20/2019 **Date Received:** 01/21/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | FARMER, WILL | 626-574-6355 | 285 W Huntington | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Blue, Melinda J | 626-233-9922 | 307 San Pascual Ave | Pasadena | CA | 91050 |
| Trainer | CASSIDY, JAMES | 626-688-1624 | 157 Madeline Drive | Monrovia | CA | 91016 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 7.00 Years | Track Surface: | Turf |
| Gender: | Female | Location on Track: | 1/4th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

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

## Laboratory Findings/Diagnosis

A 7 year old Thoroughbred [redacted] submitted with a history of right hind comminuted cannon bone fracture

Right MTIII breakdown with

Acute changes
- Open, comminuted with multiple fragments missing, complete, displaced, bi-articular, diaphyseal with dorsoproximal sagittal component and medial condylar fracture of MTIII
- Open, comminuted, complete, non-articular, transverse fracture of the MTII and MTIV
- Severe fraying and diffuse hemorrhage of body of the suspensory ligament

Chronic changes
- Mild dorsal metatarsal disease with diffuse, red petechiae in cortical bone and subtle thickening of the remaining periosteum
- Moderate, focal, uniaxial, rounded cartilage depression with dark blue center, surrounded by mildly fibrillated cartilage of the

medial condyle of the distal MTIII
- Moderate lipping of the dorsal and plantar margin of the proximal articular surface of P1
- Moderate cartilage fibrillation of the dorsomedial margin of the proximal articular surface of P1

Left hind limb:

Chronic changes
- Mild dorsal metatarsal disease with very mild periosteum thickening and multifocal, subtle petechiae in the proximodorsal cortical bone
- Moderate, focal, rounded cartilage depression with dark red center, surrounded by mildly fibrillated cartilage of the lateral condyle on the distal MTIII
- Moderate lipping of the dorsal and plantar margin of the proximal articular surface of P1

Other findings:
Gastric ulcers, squamous portion, multifocal

## Case Summary

03/18/19: The case was re-opened due to necessary minor corrections (typographical errors). Further testing is concluded.

1/27/19: The most important findings include open, complete, highly comminuted with numerous fragments missing, fracture of the diaphysis, dorsoproximal cortex and medial condyle of the third metatarsal/cannon bone. The fracture resulted in the loss of support of the right hindlimb. The injury most likely was associated with focal porosity surrounded by highly sclerotic bone in medial condyle and mild dorsal cortex remodeling that combined together, likely predisposed to complete fracture of cannon bone. Despite the fact that dorsal metatarsal disease was very mild and presumably at this stage could not cause the catastrophic breakdown alone, co-existent with fairly advanced pre-existing lesion within any of the condyles of distal MTIII, may result in complete fracture, like in this case. Summarizing, horses with bilateral dorsal metatarsal/metacarpal disease should always be considered at risk for catastrophic fractures.

01/24/2019: Hind limbs were removed bilaterally above the chestnut and a thorough musculoskeletal gross examination will be conducted. The lesions observed in the stomach are frequent findings in race horses and likely incidental. Several tests are pending and I will keep you posted with these results.

## Clinical History

Down the hill 1.5 mile turf race. Less than 1/16 after crossing over dirt track back on to turf, horse immediately went wrong (approx 1/2 mile into the race). RH compound comminuted MTIII fx.

## Gross Observations

The necropsy of a 400kg, 7-year old [redacted] Thoroughbred [redacted] (lip tattoo [redacted] started at 10:37 am on Monday, January 21 2019. The carcass had a good post-mortem preservation condition and good nutritional condition, with good muscling and fat reserves. Within the squamous portion of the stomach along the marco plicatus there were numerous, 1-3 cm diameter, multifocal to coalescing ulcers. No further findings to report. Legs examination to follow.

## CHRB Musculoskeletal

Both hind limbs were examined distally to the tibio-tarsal joints. The following changes were seen:

RIGHT HIND LIMB

MTIII
- Open, comminuted with multiple fragments missing, complete, displaced, bi-articular, diaphyseal with dorsoproximal sagittal component and medial condylar fracture of MTIII with incomplete sagittal stress fractures adjacent proximally to the main fracture line

The middle of the diaphysis is highly comminuted. Multiple key fragments are missing- in the specimen there are no fragments of dorsomedial and dorsolateral diaphysis. Only few fragments of the plantar aspect of mid-shaft remain attached to the severely hemorrhagic and frayed body of the suspensory ligament. The cannon bone is divided into 2 major, distal and proximal

components. The dorsoproximal aspect is divided into 3 fragments in sagittal plane, resulting in complete separation of the dorsal and plantar parts of the proximal segment. The cortical bone of the proximal segment is mildly reddened along the fracture line. The dorsal periosteal surface of the remaining fragments appears to be mildly roughened/irregular and also slightly thickened. The distal segment is split into 2 major pieces by a medial, condylar, parasagittal, articular fracture. The lateral fragment is divided roughly into half in transverse plane.
The mild, red petechiae are diffusely present in the dorsoproximal cortical bone and along the proximal edge of the distal fracture component.
- Medial condylar, parasagittal, articular stress fracture- the opposing surfaces of the fracture reveal focal, brown spot of increased bone porosity surrounded by highly compacted/sclerotic bone
- Moderate, focal, uniaxial, rounded cartilage depression with dark blue center, surrounded by mildly fibrillated cartilage of the medial condyle of the distal MTIII

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

MTII
- Complete, transverse, simple, displaced fracture at the level of the mid-shaft, from the distal component there is only a small part of the splint button in the specimen

MTIV
- Complete, transverse, simple, displaced fracture at the level of the mid-shaft, the distal part of the bone is completely missing

SUSPENSORY LIGAMENT
- Severe fraying and diffuse hemorrhage with multiple small bony fragments embedded in the dorsal surface of the body of the suspensory ligament at the level of the fracture

P1
- Moderate lipping of the dorsal and plantar margin of the proximal articular surface of P1
- Moderate cartilage fibrillation of the dorsomedial margin of the proximal articular surface of P1
- Mild scoring of the proximal articular surface of P1

LEFT HIND LIMB

MTIII
- Mild dorsal metatarsal disease with very mild periosteum thickening and multifocal, subtle petechiae in the proximodorsal cortical bone
- Moderate, focal, rounded cartilage depression with dark red center, surrounded by mildly fibrillated cartilage of the lateral condyle on the distal MTIII

P1
- Moderate lipping of the dorsal and plantar margin of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other structures of both distal hind limbs examined from the level of the midshaft of the tibia to the hoof.

Acc # [redacted]
Date 01/25/19
CC MAS

Metatarsal Bones - Right

**Nature:**

- [x] Open
- [ ] Simple
- [x] Complete
- [x] Displaced
- [x] Articular
- [ ] Closed
- [x] Comminuted
- [ ] Incomplete
- [ ] Non-displaced
- [ ] Non-articular

**Location:**

- [x] Proximal Epiphyseal
- [x] Proximal Metaphyseal
- [x] Proximal Physeal
- [x] Diaphyseal
- [x] Condylar
  - Medial ____ cm
  - Lateral ____ cm
- [x] Distal Epiphyseal
- [x] Distal Metaphyseal
- [x] Distal Physeal

**Configuration:**

- [x] Axial (longitudinal)
- [ ] Transverse
- [ ] Segmental
- [ ] Butterfly
- [ ] Oblique

**Direction:**

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

**Pre-existing callus:**

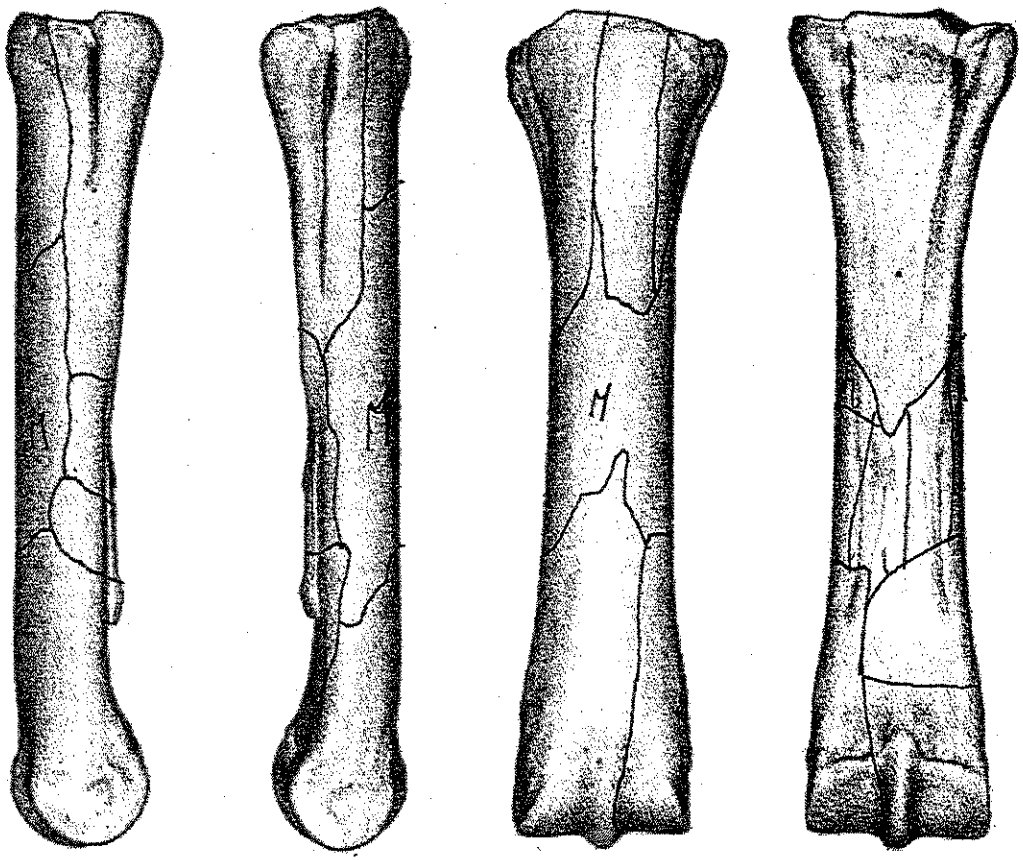
- [ ] Yes
- [ ] No
- [x] Unable to evaluate

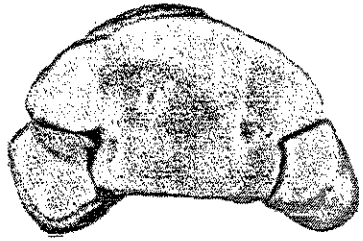
**Legend:**

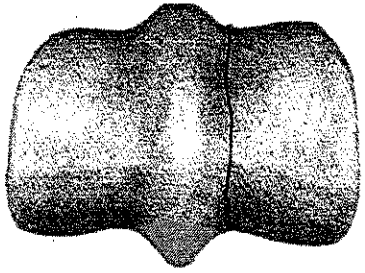
Callus

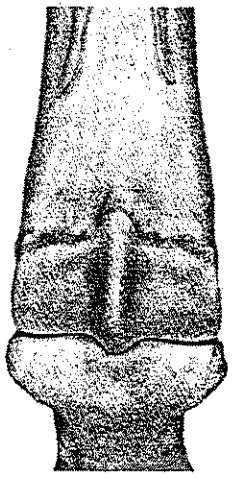
Incomplete Fx

M Missing fragments







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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 4/5/2019 2:17:55PM

**Email To:**
Baker, Rita L
RitaB@chrb.ca.gov

**Incident Track:**
FARMER, WILL
285 W HUNTINGTON,
Arcadia CA 91007
Los Angeles County

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

**Date Collected:** 03/31/2019 **Date Received:** 04/01/2019

**Comments:** CHRB

## Case Contacts

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|---|---|---|---|---|---|---|
| Submitter | FARMER, WILL | 626-574-6355 | 285 W Huntington | 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] |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | Baker, Rita L | 916-263-6038 | 1010 Hurley Way, Suite #300 | Sacramento | CA | 95825 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Dowd, Joe | 818-400-7498 | P.O Box 661955 | Arcadia | CA | 91066 |
| Trainer | MILLER, PETER | 760-715-1522 | 7 Santa Rosa Court | Manhattan Bea | CA | 90266 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 5.00 Years | Track Surface: | Turf |
| Gender: | Neutered Male | Location on Track: | 1/4th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

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

## Laboratory Findings/Diagnosis

Euthanized 5 year-old, [redacted] Thoroughbred [redacted] submitted with history of right front compound lateral condyle fracture with medial proximal sesamoid bone fracture and possible lateral proximal sesamoid bone fracture

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 (palmar osteochondral disease, see chronic changes 1.)
2. Open, mid-body and apical, complete, articular, transverse, displaced, fractures of the medial proximal sesamoid bone
3. Open, comminuted, complete, articular, displaced avulsion fracture of the axial margin of the lateral proximal sesamoid bone

4. Open, simple, non-articular, transverse, displaced fracture of the MCII and MCIV
5. Severe, complete, longitudinal rupture of the medial branch of the suspensory ligament
6. Complete luxation of the fetlock joint- MCIII completely perforated the skin, which resulted in complete exposure of the distal half of the cannon bone
7. Severe, complete, transverse rupture of the medial collateral ligaments of the fetlock
8. Severe fraying of fibers of the lateral collateral ligament of the fetlock
9. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
10. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
11. Severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the deep digital flexor tendon
12. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
13. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
14. Severe, full thickness, multifocal cartilage loss of the distal articular surface of MCIII
15. Severe, extensive cartilage loss of the articular surface of the lateral proximal sesamoid bone
16. Severe scoring of the distal articular surface of MCIII

CHRONIC CHANGES:
1. Severe, palmar osteochondral disease with brown, focal discoloration and porosity of the subchondral bone, surrounded by rim of neovascularization and highly compacted (sclerotic) trabecular bone, visible on both opposing surfaces of the fractured lateral condyle of the distal MCIII
2. Moderate, focal, blue subchondral bone discoloration (bruising) of the mid-sagittal ridge of the distal articular surface of MCIII
3. Osteochondral fragment (OCD) of the dorsal articular margin of the intermediate facet of the distal radius
4. Chip fracture of the axial margin of the proximal articular surface of the carpal intermediate bone
5. Moderate lipping of the dorsal margin of the proximal articular surface of P1
6. Moderate, biaxial ostechondral fragmentation of the palmar margin of the proximal articular surface of P1

LEFT FORELIMB

CHRONIC CHANGES
1. Moderate to severe, biaxial palmar osteochondral disease with focal, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the condyles of the distal articular surface of MCIII
2. Moderate, biaxial transverse ridge arthrosis with cartilage fibrillation and red discoloration of the distal articular surface of MCIII
3. Moderate lipping of the dorsal aspect of the proximal articular surface of P1
4. Moderate proliferative synovitis of the fetlock joint

Other findings:
- Hemabdomen
- Liver trauma- 18.5 cm long tear of the right lobe
- Pulmonary congestion and edema (euthanasia artifact)

## Case Summary

04/02/19: The most important findings in the right forelimb are lateral condylar fracture of the cannon bone, fractures of the proximal sesamoid bones, and rupture of the medial branch of suspensory ligament. 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.

04/01/19 The horse sustained liver injury of traumatic origin, and hemabdomen noted is a consequence of the liver tear. Most likely, the injury occurred secondary to the fall caused by right front fetlock breakdown.
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

Horse went bad at transition from turf to dirt. RF compound lateral condyle fx with medial sesamoid fx and possible lateral sesamoid fx.

Additional history per Dr. W Farmer 4/3/19

Please note that when [redacted] fell, a rival behind fell over him .

Also, the rider of the other horse was injured and taken off his remaining mounts.

## Gross Observations

Necropsy of a 5 year old, [redacted] Thoroughbred [redacted] 474 kg, with [redacted] and [redacted] commenced at 8:49 am, April 1, 2019. The carcass is in good nutritional condition, with appropriate musculature, good deposits of adipose tissue, and is in good post-mortem condition. The trachea contains abundant stable foam, and both lungs are inflated, mottled pink to red, spongy and wet (euthanasia artifact). The spleen is pale and decreased in size. There is a large, irregularly shaped focus of hemorrhage in muscular portion of the diaphragm along the pleural margin on the left side. Abdominal cavity contains approximately 2 liters of frank blood. The liver is slightly pale, reduced in size, and the right hepatic lobe has 18.5 cm long by 0.5 cm to cm deep, jagged tear involving both the dorsal and ventral surfaces. The spleen is also pale and decreased in size. 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- RADIUS
1. Osteochondral fragment (OCD) of the dorsal articular margin of the intermediate facet of the distal radius- the OCD fragment is rectangular in shape ( app. 1.5 cm x 0.5 cm), its ventral margin is accompanied by rim of marked cartilage ulceration

B- CARPUS
1. Chip fracture of the axial margin of the proximal articular surface of the intermediate carpal bone (app. 0.5 cm x 0.2cm). The subchondral bone along the dorsal margin, adjacent to the chipped fragment has blue discoloration visible through the cartilage (bruising). The rim of discoloration is app. 2 cm long.

C- MCIII
1. Open, comminuted, complete, displaced, articular, parasagittal, lateral condylar fracture of the MCIII with the presence of pre-existing lesion
The condylar fragment is app. 8 cm long. The opposing surfaces of the fracture reveal focus of brown discoloration of increased bone porosity (osteopenic focus) surrounded by red rim of neovascularization and highly compacted/sclerotic trabecular bone. There is a significant cartilage loss along the fracture line.
The dorsal cortex of the proximal third of the cannon bone, especially surrounding the fracture line has diffuse, dash-shaped, black/violet petechiae.
2. Severe, palmar osteochondral disease with brown, focal discoloration and porosity of the subchondral bone visible on both opposing surfaces of the fractured lateral condyle the distal articular surface of MCIII
3. Severe scoring of the distal articular surface of MCIII
4. Severe, focal, full thickness, extensive longitudinal (app. 2 cm long) cartilage loss of the dorsal edge of the articular surface of mid-sagittal ridge of the distal MCIII
5. Severe, multifocal, rounded, app. 2 mm in diameter, full-thickness cartilage loss of the distal articular surface of MCIII
6. Complete luxation of the fetlock joint- MCIII completely perforated the skin, which resulted in complete exposure of the distal half of the cannon bone
7. Moderate, focal, blue subchondral bone discoloration (bruising) of the mid-sagittal ridge (dorsal aspect) of the distal articular surface of MCIII
8. Moderate transverse ridge arthrosis with cartilage loss, fibrillation and red discoloration of the medial condyle of the distal MCIII

D- PROXIMAL SESAMOID BONES
1. Open, mid-body and apical, complete, articular, transverse, displaced, fractures of the medial proximal sesamoid bone- the apical fragment is avulsed with intersesamoidean ligament. The opposing surfaces of the mid-body fracture reveal markedly compacted subchondral bone and highly compacted trabecular bone along the axial margin.
2. Open, comminuted, complete, articular, displaced avulsion fracture of the axial margin of the lateral proximal sesamoid bone-

the fragment is divided roughly into 4 smaller pieces, which remain firmly attached to the intersesamoidean ligament.
3. Severe, extensive cartilage loss of the articular surface of the lateral proximal sesamoid bone (app. 95% of the articular surface has no cartilage left)
4. Severe scoring of the articular surface of the medial proximal sesamoid bone
For better visualization of the fractures described above, please see attached pictures and drawings.

E- MCII
1. Open, simple, complete, non-articular, transverse, displaced fracture of the MCII- the fractured distal fourth of the bone is missing from the specimen

F- MCIV
1. Open, simple, complete, non-articular, transverse, displaced fracture of the MCII- the fractured distal fourth of the bone is missing from the specimen

G- SOFT TISSUES
1. Severe, complete, longitudinal rupture of the medial branch of the suspensory ligament- the complete separation of the branch is at the level of bifurcation, where the injury progresses further proximally as incomplete split up to proximal third of the suspensory ligament body.
2. Full thickness, transverse intersesamoidean ligament rupture with sagittal component affecting straight distal sesamoidean ligament- the tear is following the fracture line of the medial proximal sesamoid bone. The sagittal tear courses in between the proximal sesamoid bones distally to merge with full-thickness, longitudinal rupture of the straight distal sesamoidean ligament
3. Severe, complete, transverse rupture of the medial collateral ligaments of the fetlock
4. Severe fraying of fibers of the lateral collateral ligament of the fetlock
5. Severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the dorsal surface of the deep digital flexor tendon at the level of the fetlock
6. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
7. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
8. Severe synovial thickening in the fetlock joint (proliferative synovitis)

H- P1
1. Severe scoring of the proximal and distal articular surface of P1
2. Moderate lipping of the dorsal margin of the proximal articular surface of P1
3. Moderate, biaxial osteochondral fragmentation of the palmar margin of the proximal articular surface of P1
4. Moderate to severe, multifocal, irregularly shaped, full-thickness ulceration of small diameter (app. 1-2mm) of the proximal articular surface of P1

LEFT FRONTLIMB

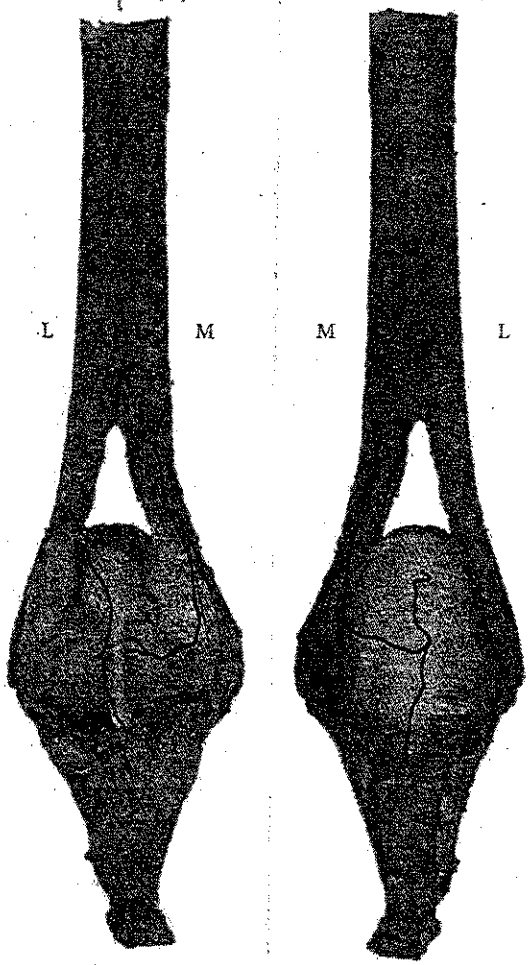
A- PROXIMAL SESAMOID BONES
1. Mild, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
2. Mild scoring of the articular surfaces of the proximal sesamoid bones

B- MCIII
1. Severe palmar osteochondral disease with focal, biaxial, rounded (app. 1.3 cm in diameter) blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the condyles of the distal articular surface of MCIII. The medial condyle is slightly more affected.
2. Mild scoring of the distal articular surface of MCIII
3. Mild hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
4. Mild hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MCIII
5. Moderate focus (4 cm x 2 cm) of dark violet petechiae on the dorsal aspect of the proximal third of the MCIII
6. Severe hemarthrosis of the fetlock joint

C- SOFT TISSUE
1. Moderate synovial thickening in the fetlock joint (proliferative synovitis)

D- P1
1. Moderate lipping of the dorsal aspect of the proximal articular surface of P1

Accession # [redacted]
CC: MAS
Date: 04/01/19



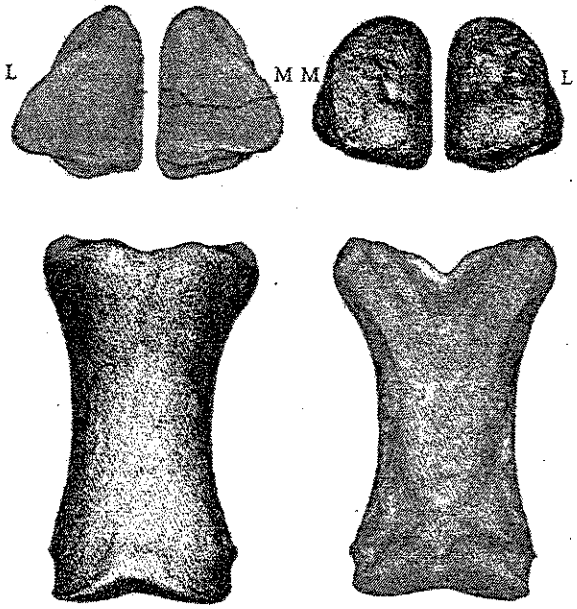

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? Yes No

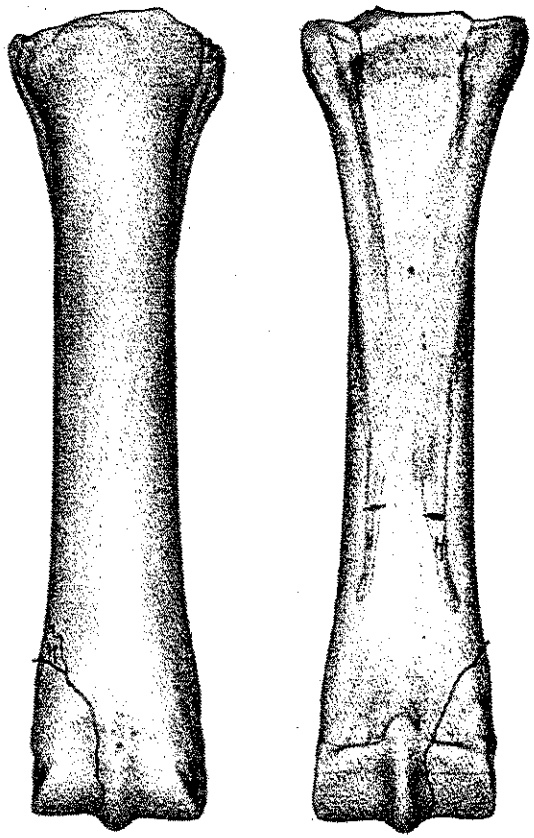
Joint capsule intact? Yes No

Joint luxated? Yes No

Right Fetlock




Please circle affected leg
foreleg
hindleg



**Involved Structures**

SDF tendon: Yes No DDF tendon: Yes No

Suspensory ligament: Yes No

SL Medial branch SL Lateral branch SL Body

Intersesamoidean ligament: Yes No
Longitudinal Transverse

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

Collateral ligaments: Yes No

Collateral Sesamoidean Ligaments: Yes No

Cruciate and/or Short Sesamoidean Ligaments Yes No

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(909) 383-4287
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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 4/1/2019 4:46:48PM

**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:** 02/23/2019 **Date Received:** 02/23/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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] |
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| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | BLEA, JEFF A | 626-886-1688 | 282 W. Sierra Madre Blvd | Sierra Madre | CA | 91024 |
| Trainer | Todaro/Hollendorfer, George/Jerry | 510-435-5482 | 1432 Sandpiper Spit | Richmond | CA | 94801 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 5.00 Years | Track Surface: | Dirt |
| Gender: | Male | Location on Track: | 1/4th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | Y |

Medications: Dormosedan (Detomidine); Lasix (Furosemide);

## Laboratory Findings/Diagnosis

A 5 year old [redacted] Thoroughbred [redacted] [redacted] submitted with history of right hind complete, displaced, lateral condylar fracture, P1 comminuted fracture, comminuted medial proximal sesamoid bone fracture, suspensory apparatus rupture (horse was working in company)

Catastrophic right hind fetlock breakdown with:

RIGHT HINDLIMB

ACUTE CHANGES
1. Closed, comminuted, complete, displaced, articular, parasagittal, lateral condylar fracture of the MTIII with the presence of pre-existing lesion (biaxial plantar osteochondral disease, see chronic changes 1.)
2. Fractures of the proximal sesamoid bones
a) Closed, simple, complete, displaced, articular, transverse, apical/mid-body fracture of the medial proximal sesamoid bone

b) Closed, 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 fracture of P1
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 the 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 plantar annular ligament

CHRONIC CHANGES:
1. Severe plantar ostechondral disease with subtle, brown, focal discoloration and porosity of the subchondral bone visible on both opposing surfaces of the fractured lateral condyle of the distal MTIII

LEFT HINDLIMB

CHRONIC CHANGES

Moderate osteoarthritis of the fetlock joint
1. Mild to moderate plantar ostechondral disease with focal, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MTIII
2. Moderate to severe, focal, blue subchondral bone discoloration visible through the thinned cartilage of the plantar third of the intermediate groove of the proximal articular surface of P1
3. Mild dorsal metatarsal disease with periosteum congestion and thickening
4. Mild transverse ridge arthrosis with cartilage fibrillation and pitting of the distal articular surface of MTIII
5. Moderate lipping of the dorsal and plantar aspect of the proximal articular surface of P1
6. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
7. Mild to moderate, biaxial, blue rim of subchondral bone discoloration (bruising) along the basilar margin of the proximal sesamoid bones
8. Moderate thickening and of the lateral short sesamoidean ligament (ligament feels very firm and rigid- suggestive of calcification)
9. 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)

Further histologic examination of the testicles pending

## Case Summary

4/1/19: The case will be closed, as the musculoskeletal examination is complete; however, once the reproductive pathologist review of the testicles is complete, the case will be reopened to report the findings.

02/28/19: The most important findings in the right hindlimb are lateral condylar fracture of cannon bone, biaxial fracture of proximal sesamoid bones, comminuted fracture of proximal phalanx and suspensory ligament failure. The latter injuries resulted in loss of support of the fetlock joint of the right hindlimb.
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.
Histology of the testicles will be further examined by a reproductive pathologist to determine if there are any significant changes.

02/23/19: No significant findings were identified in visceral organs. At the time of necropsy, both hind 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 Hind: complete, displaced lateral condylar fracture, P1 comminuted fracture, comminuted medial proximal sesamoid bone fracture, suspensory apparatus rupture (horse was working in company); Hx: subfertile stallion.

## Gross Observations

Necropsy of a 5 year old, [redacted] Thoroughbred [redacted] 530 kg, with [redacted], [redacted] is commenced at 1:40 pm, 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 hind limbs are removed at the level of the chestnut for further examination.

Examination of testicles and epidydmis

Both testicles appeared to be reduced in size (right: 10,5 cm x 7 cm x 4,5 cm; left: 11,5 cm x 7cm x 5cm), relatively soft and lacking in turgor (cut surface does not bulge). Testicular parenchyma was light brown (darker color color than normal).

## CHRB Musculoskeletal

Both hind limbs were examined distally from the mid-shaft of tibia. Following changes were seen:

RIGHT HIND

A- MTIII
1. Closed, simple, complete, displaced, articular, parasagittal, lateral condylar fracture of the MTIII with the presence of pre-existing lesion

The lateral condylar fragment is app. 14,5 cm long and is divided into two components in transverse plane app. in proximal third. The condylar fracture is coursing through blue subchondral bone discoloration visible through the remaining cartilage. The opposing surfaces of the fracture reveal focus of brown discoloration of increased bone porosity (osteopenic focus) surrounded by highly compacted/sclerotic bone. The proximal edges of the of the condylar fragment are slightly irregular due to comminution which resulted in separation of multiple, small, irregularly shaped fragments, mostly from the dorsal aspect.

2. Severe plantar ostechondral disease with subtle, brown, focal discoloration and porosity of the subchondral bone visible on both opposing surfaces of the fractured lateral condyle of the distal MTIII
3. Severe scoring of the distal articular surface of MTIII
4. Severe, focal, full thickness, longitudinal cartilage loss of the dorsal edge of mid-sagittal ridge of the distal articular surface of MTIII
5. Moderate to severe hemorrhage accompanied by soft tissue hypertrophy at the plantar aspect of the supracondylar region of MTIII
6. Moderate to severe hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MTIII

B- PROXIMAL SESAMOID BONES
1. Fractures of the proximal sesamoid bones
a) Closed, simple, complete, displaced, articular, transverse, apical/mid-body fracture of the medial proximal sesamoid bone- highly compacted trabecular bone is present on both opposing surfaces, especially on the distal component.
b) Closed, 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.
2. Severe, full thickness cartilage loss along the fracture line of the lateral proximal sesamoid bone
3. 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 P1- probably the main fracture line originates from the plantar aspect of intermediate groove (the cartilage in this location is significantly thinned and subchondral bone appears to be porous- analogous findings can be located in the contralateral P1, see section describing P1 of left hindlimb- D 1.). The fracture line coursing through the intermediate groove is crescent shaped and divides the proximal articular surface into medial and lateral components. The medial fragment is slightly bigger and consists of 4 pieces- axial containing the part of intermediate groove and plantar separating the plantar eminence from the rest of the proximal articular surface. The lateral fracture component is divided into two major fragments, also created by separation of the plantar eminence from the rest of the proximal surface. The main fracture line courses distally to reach the distal articular surface. The latter is divided axially into lateral and medial components. The mid-shaft is shattered, it 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 plantar annular ligament
2. Suspensory ligament failure: severe, 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 third of the mid-body of the suspensory ligament, affecting mainly its plantar 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. Severe synovial thickening in the fetlock joint (proliferative synovitis)

LEFT HIND

A- PROXIMAL SESAMOID BONES
1. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
2. Mild to moderate, biaxial, blue rim of subchondral bone discoloration (bruising) along the basilar margin of the proximal sesamoid bones (more distinct on the lateral proximal sesamoid bone)

B- MTIII
1. Moderate plantar ostechondral disease with focal, rounded (app. 0.7 cm in diameter) blue/grey subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MTIII
2. Mild dorsal metatarsal 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 MTIII
3. Mild transverse ridge arthrosis with cartilage fibrillation and pitting of the distal articular surface of MTIII
4. Mild, biaxial, shallow fissures (app. 1 cm long) and fibrillation of the cartilage of the condylar grooves
5. Mild hemorrhage accompanied by soft tissue hypertrophy at the plantar aspect of the supracondylar region of MTIII
6. Mild hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MTIII

C- SOFT TISSUE
1. Moderate synovial thickening in the fetlock joint (proliferative synovitis)- especially the dorsal aspect of the fetlock joint capsule
2. Moderate, thickening and of the lateral short sesamoidean ligament (ligament feels very firm and rigid- suggestive of calcification)

D- P1
1. Moderate to severe, focal, blue subchondral bone discoloration visible through the thinned cartilage of the plantar third of the intermediate groove of the proximal articular surface of P1- the cross section of the affected area revealed focally extensive, significant cartilage thinning and porosity of the underlying subchondral bone.
2. Moderate, focal cartilage ulceration with fibrillation of the dorsal aspect of the medial proximal articular surface of P1 (app. 0.5 cm from the dorsomedial articular margin, adjacent to the intermediate groove)
3. Moderate lipping of the dorsal and plantar aspect of the proximal articular surface of P1

4. Mild, biaxial, pink discoloration of the cartilage of the axial margin of the plantar eminences of proximal articular surface of P1

No gross lesions/ abnormalities were identified in other sturctures of both distal hind limbs examined from the mid-shaft of tibia.

## Histology

Microscopic examination of the testicular tissue is pending

## 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.

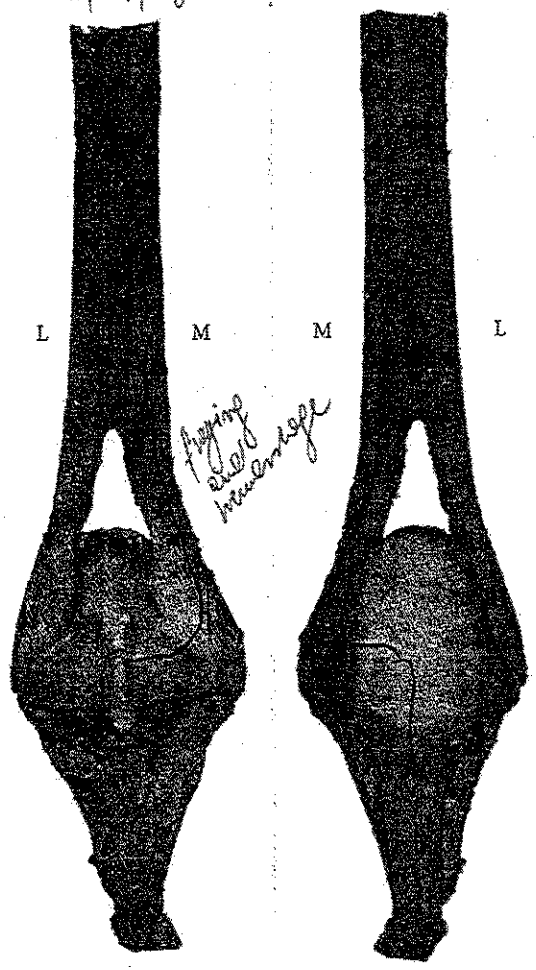
The detected liver mineral results are within acceptable or non-diagnostic ranges for this species.

**Heavy Metals Screen-CHRB**

| Animal/Source | Specimen | Specimen Type |
|---|---|---|
| [redacted] | [redacted] | Liver Tissue |

| Analyte | Result | Units | Rep. Limit | Units |
|---|---|---|---|---|
| Lead | Not Detected | ppm | 1 | ppm |
| Manganese | 1.3 | ppm | 0.1 | ppm |
| Iron | 290 | ppm | 1 | ppm |
| Mercury | Not Detected | ppm | 1 | ppm |
| Arsenic | Not Detected | ppm | 0.05 | ppm |
| Molybdenum | 0.57 | ppm | 0.4 | ppm |
| Zinc | 31 | ppm | 0.3 | ppm |
| Copper | 3.9 | ppm | 0.3 | ppm |
| Cadmium | 0.79 | ppm | 0.3 | ppm |
| Cobalt | 0.06 | ppm | 0.01 | ppm |
| Selenium | 0.43 | ppm | 0.02 | ppm |

Accession # [redacted]
CC: MAS
Date: 02/27/19



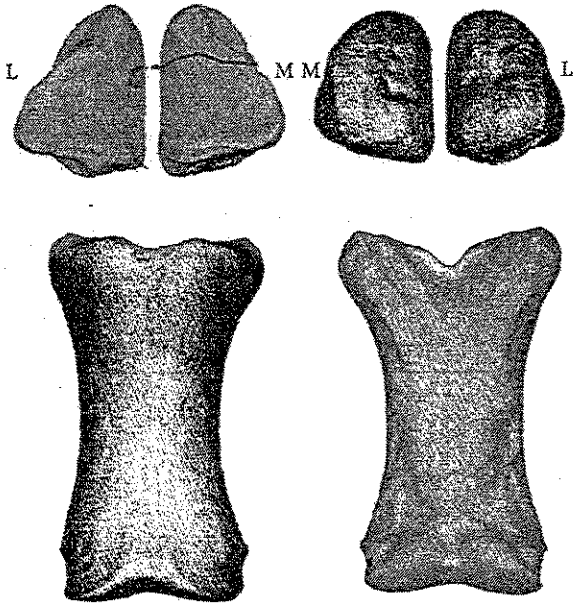

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? Yes (No)

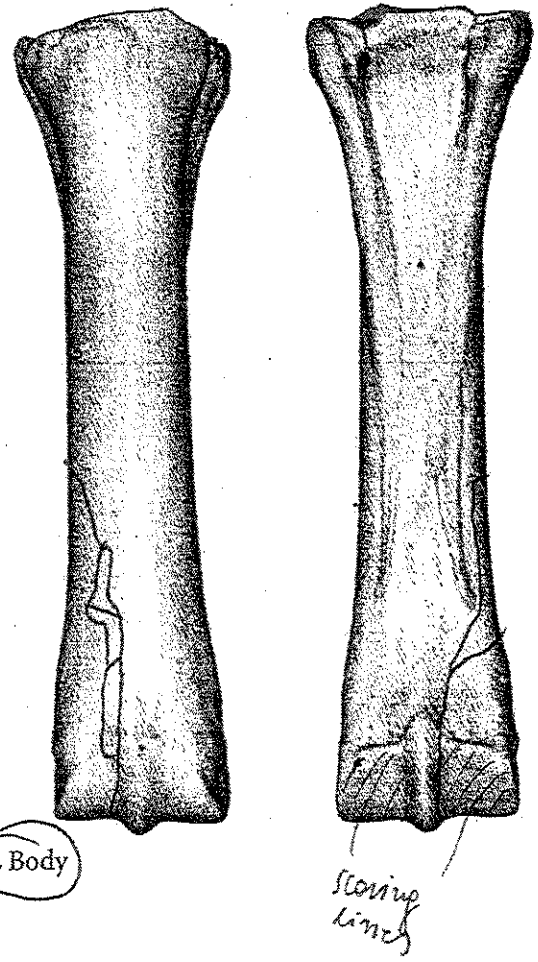
Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

Right Fetlock




Please circle affected leg
foreleg
hindleg




**Involved Structures**

SDF tendon: Yes (No) DDF tendon: Yes (No)

Suspensory ligament: (Yes) No

SL (Medial branch) SL Lateral branch SL Body

Intersesamoidean ligament : (Yes) No
(Longitudinal) (Transverse)

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

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Acc # [redacted]
Date 02/27/19
CC MAS

# Proximal Phalanx - Right

**Nature:**

- [ ] Open
- [x] Closed
- [ ] Simple
- [x] Comminuted
- [x] Complete
- [ ] Incomplete
- [x] Displaced
- [ ] Non-displaced
- [x] Articular
- [ ] Non-articular

**Location:**

- [x] Proximal Epiphyseal
- [x] Distal Epiphyseal
- [x] Proximal Metaphyseal
- [x] Distal Metaphyseal
- [x] Proximal Physeal
- [x] Distal Physeal
- [x] Diaphyseal

**Configuration:**

- [x] Axial (longitudinal)
- [ ] Butterfly
- [ ] Transverse
- [x] Oblique
- [ ] Segmental

**Direction:**

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

**Pre-existing callus:**

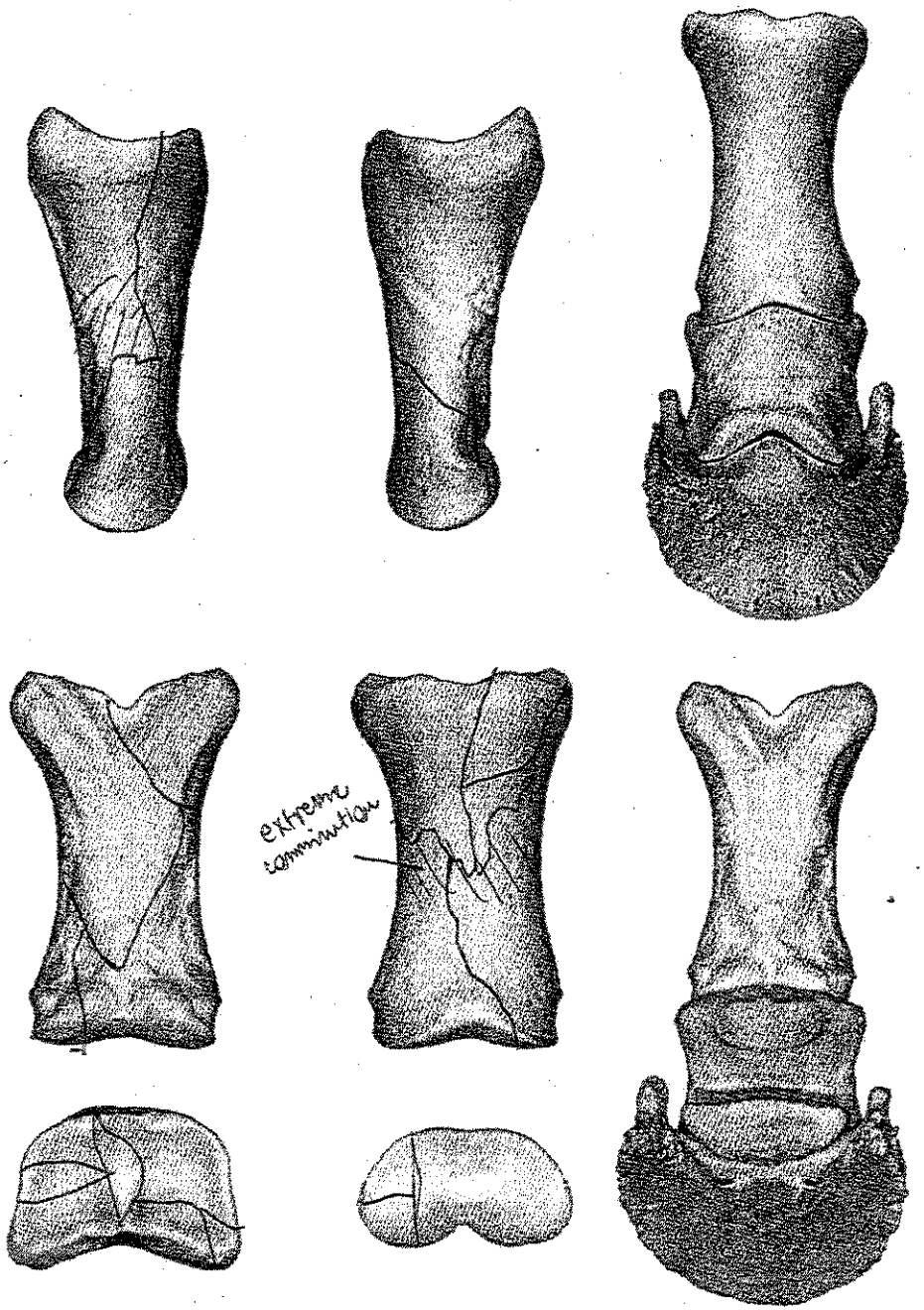
- [ ] Yes
- [x] No
- [ ] Unable to evaluate

**Legend:**

Callus //// - high comminution

– – – Incomplete Fx

M Missing fragments



UCDAVIS
VETERINARY MEDICINE
105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
www.cahfs.ucdavis.edu

**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/18/2019 5:00:00PM

**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:** 02/25/2019 **Date Received:** 02/25/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | DOWD, JOSEPH | 818-400-7498 | Po Box 661956 | Arcadia | CA | 91066 |
| Trainer | Glatt, Mark | 626-483-9496 | 1147 E Lemon Street | Monrovia | CA | 91016 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | 1/4 Pole |
| Taxonomy: | Thoroughbred Horse | Insured? | |

Medications: Acepromazine; Pentobarbital; Rompun (Xylazine);

## Laboratory Findings/Diagnosis

A 3 year old [redacted] Thoroughbred [redacted] [redacted] submitted with history of left front closed, comminuted, biaxial proximal sesamoid bone fracture with suspensory apparatus failure

Catastrophic breakdown of left front fetlock with

LEFT FORELIMB

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones
a) Closed, comminuted, articular, transverse, displaced, mid-body/basilar, fracture of the lateral proximal sesamoid bone with axial and abaxial avulsion fracture component
b) Closed, comminuted, articular, transverse, displaced, mid-body fracture of the medial proximal sesamoid bone with axial and abaxial avulsion fracture component and probable predisposing lesion identified in abaxial aspect of the distal fracture fragment

2. Chip fracture of the abaxial margin of the dorsal aspect of the lateral condyle of the distal articular surface of MCIII
3. Severe, full-thickness, complete, transverse rupture of the deep digital flexor tendon
4. Severe, full thickness, incomplete, transverse rupture of the superficial digital flexor tendon
5. Severe, full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
6. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
7. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
8. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
9. Severe scoring and multifocal, irregularly shaped cartilage ulceration of the distal articular surface of MCIII
10. Moderate to severe, deep, biaxial, erosions of the dorsal and palmar aspect of the proximal articular surface of P1

RIGHT FORELIMB

CHRONIC CHANGES
1. Moderate, focal, blue subchondral bone discoloration visible through the slightly depressed cartilage of the abaxial aspect of the medial proximal sesamoid bone (analogous location as the pre-existing lesion in medial proximal sesamoid bone in fractured limb)
2. Moderate, focal, biaxial, blue subchondral bone discoloration visible through the cartilage of the axial aspect of the palmar eminences, adjacent to the intermediate groove of the proximal P1
3. Mild to moderate dorsal metacarpal disease with pink, diffuse discoloration of the dorsal cortex (presumably due to woven bone formation) accompanied by congestion and thickening of the periosteum
4. Mild to moderate, biaxial, rounded thickening of the proximal third of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia)

Other findings:
- Mild, shallow gastric ulceration of non-glandular mucosa along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

03/18/19: Further testing is concluded.

03/08/19: The most important findings in the left forelimb are biaxial fractures of the proximal sesamoid bones and complete rupture of the deep digital flexor tendon. The latter injuries resulted in loss of support of the fetlock joint in the left forelimb. The aforementioned fractures may be related to the focal region of discoloration and bone porosity/osteopenic focus associated with the distal fracture surface in the medial proximal sesamoid bone. Furthermore, changes of similar nature were identified in the proximal sesamoid bones in contralateral limb. Additional findings include chronic changes affecting the intact, right forelimb. They are unilateral dorsal metacarpal disease affecting right cannon bone, subchondral bone bruising of proximal P1 and presumably chondroid metaplasia of distal oblique sesamoidean ligaments.

02/25/19 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

Left foreleg: Closed, comminuted, biaxial proximal sesamoid bone fractures w/suspensory apparatus failure; (lost rider and ran loose after sustaining injury).

## Gross Observations

Necropsy of a 3 year old, [redacted] Thoroughbred [redacted] 523 kg, with a [redacted], microchip [redacted] is commenced at 1:40 pm, February 25, 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). On the left kidney, there are multifocal to coalescing, white/grey, irregular areas (app. 3 cm x 2 cm) of capsular thickening (presumably interstitial fibrosis). The stomach contains green, soft roughage and grain particles. Non-glandular gastric mucosa has very shallow and small (app. 0.5cm in

diameter) 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:

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones
a) Closed, comminuted, articular, transverse, displaced, mid-body/basilar, fracture of the lateral proximal sesamoid bone with axial and abaxial avulsion fracture component- the distal component is divided roughly in axial 1/3 by slightly oblique fracture line into two pieces. The proximal component is divided roughly into four fragments. Two of them broke off along the insertion of the branch of suspensory ligament and are avulsed with lateral branch. There is triangular fragment, adjacent to the described fragments, which is avulsed with intersesamoidean ligament together with axial smaller piece.
b) Closed, comminuted, articular, transverse, displaced, mid-body fracture of the medial proximal sesamoid bone with axial and abaxial avulsion fracture components and probable predisposing lesion identified in abaxial aspect of the distal fracture fragment -A possible region of increased porosity is present at the abaxial aspect of the articular surface on distal fracture surface of the medial proximal sesamoid bone. The fracture line propagates through a subchondral focus of brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral and trabecular bone is highly compacted (sclerotic) on both opposing surfaces of the fracture.

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

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament rupture with short sagittal component affecting straight distal sesamoidean ligament- 'Y' shaped, the tear is following the main fracture line of the proximal sesamoid bones
2. Moderate to severe proliferative synovitis of the fetlock joint
3. Severe, full-thickness, complete, transverse rupture of the deep digital flexor tendon
4. Severe, full thickness, incomplete, transverse rupture of the superficial digital flexor tendon
5. Severe, full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
6. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
7. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
8. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones

C- MCIII
1. Chip fracture of the abaxial margin of the dorsal aspect of the lateral condyle of the distal articular surface of MCIII
2. Severe scoring of the distal articular surface of MCIII with multiple vertical clefts of variable depth and width
3. Severe, multifocal, irregularly shaped cartilage loss of the distal articular surface of MCIII
4. Severe, focal, full thickness, irregularly shaped cartilage loss on the dorsal aspect of the mid-sagittal ridge of the distal articular surface of MCIII
5. Moderate to severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
6. Moderate to severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

D- P1
1. Severe scoring lines of the proximal articular surface of P1
2. Moderate to severe, biaxial, deep bony erosion of the dorsal and palmar aspect of the proximal articular surface of P1
3. Moderate lipping of the dorsal and palmar margins of the proximal articular surface of P1

RIGHT FRONT

A- PROXIMAL SESAMOID BONES
1. Moderate, focal, blue subchondral bone discoloration visible through the slightly depressed cartilage of the abaxial aspect of the medial proximal sesamoid bone with short fissure located centrally (analogous location as the pre-existing lesion in medial

proximal sesamoid bone in fractured limb)
2. Mild to moderate, biaxial apical modeling with irregular bony outgrowth accompanied by focal, blue discoloration of the subchondral bone visible through the cartilage

B- SOFT TISSUES
1. Mild to moderate, biaxial, rounded thickening of the proximal third of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia)

C- MCIII
1. Mild to moderate dorsal metacarpal disease with pink, diffuse discoloration of the dorsal cortex (presumably due to woven bone formation) accompanied by congestion and thickening of the periosteum - the cross section at the level of mid diaphysis revealed app. 1-2 mm thick rim of the new, consolidated bone and multifocal, dark red petechiae, especially affecting dorsomedial aspect of the trabecular bone. The outer layer of the dorsal cortex/pink discoloration is most likely formed by woven bone.

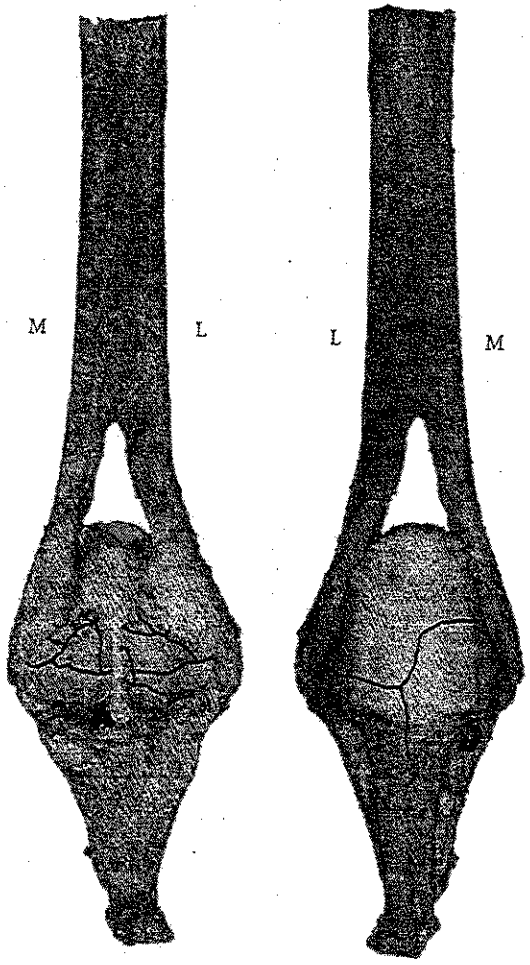
D- P1
1. Moderate lipping of the dorsal aspect of the proximal articular surface of P1
2. Moderate, focal, biaxial, blue subchondral bone discoloration visible through the cartilage of the axial spect of the palmar eminences, adjacent to the intermediate groove of the proximal P1, which turns into pink discoloration of the cartilage when moving towards palmar margin of the articular surface.

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

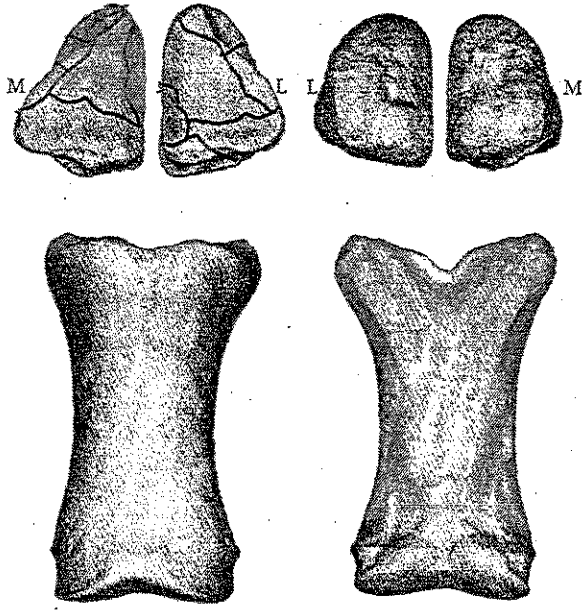
Accession # [redacted]
CC: MAS
Date: 03/07/19

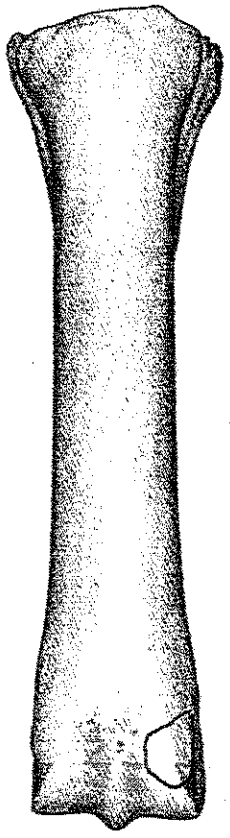
Left Fetlock

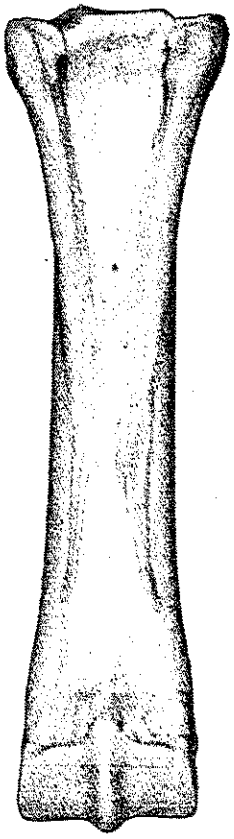
Please circle affected leg
(foreleg)
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)





**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: Yes (No)

SL Medial branch SL Lateral branch SL Body

Intersesamoidean ligament: (Yes) No
(Longitudinal) (Transverse)

Distal Sesamoidean ligaments: (Yes) No (straight and/or oblique)

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments: (Yes) No

Open wound? Yes (No)

Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

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VETERINARY MEDICINE
105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
www.cahfs.ucdavis.edu

**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 2/22/2019 9:59:15AM

**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:** 02/06/2019 **Date Received:** 02/07/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | SIMPSON, EDWIN | 818-970-1536 | P O Box 338 | Sierra Madre | CA | 91025 |
| Trainer | GARCIA, ANTONIO | 626-205-5129 | 419 W Walnut | Monrovia | CA | 91016 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Female | Location on Track: | Past Wire |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Butazolidin (Phenylbutazone); Lasix (Furosemide); Rompun (Xylazine); Torbugesic (Butorphanol);

## Laboratory Findings/Diagnosis

Three year old [redacted] Thoroughbred [redacted] submitted with a history of right front biaxial sesamoid bones fracture with associated suspensory apparatus damage; fetlock dropping, partial luxation

Catastrophic breakdown of right front fetlock with:

RIGHT FRONTLIMB
ACUTE CHANGES
1. Fracture of the medial proximal sesamoid bones
a) Closed, biaxial, simple, articular, transverse, displaced, apical fracture
2. Suspensory ligament failure ('acute-on-chronic') with severe, incomplete rupture, fraying and thick layer of yellow connective tissue firmly adhered to the palmar surface of both branches. The fraying, edema and hemorrhage expands all the way to the proximal third, including the suspensory origin (high suspensory desmitis). The multiple cross sections through the body revealed defect (discolored, yellow, presumably 'core lesion') affecting app. 60-70% of cross sectional area.

3. Full thickness, transverse rupture of the intersesamoidean ligament

CHRONIC CHANGES:
1. Mild dorsal metacarpal disease with mild periosteal thickening and congestion and multifocal, dark pink discoloration of the cortical bone in the dorsal proximal third of the cannon bone
2. Severe, extensive outgrowth of the medial splint bone ('blind splint')

LEFT FORELIMB

ACUTE CHAGES
1. Chip fracture with cartilage ulceration along the fractured fragment on the cranial margin of the intermediate facet of the distal articular surface of radius

CHRONIC CHANGES
1. Severe, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
2. Mild to moderate dorsal metacarpal disease with slight convex appearance of the cortex and mild periosteal thickening and congestion
3. Moderate, uniaxial palmar osteochondral disease with blue, focal subchondral bone discoloration visible through the cartilage and centrally located cartilage depression of the flattened lateral condyle of the distal articular surface of MCIII
4. Severe, extensive outgrowth of the medial splint bone ('blind splint')

Other findings:
- Mild, multifocal gastric hyperkeratosis along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

02/14/19: The most important finding in the right forelimb is suspensory apparatus failure and biaxial, apical proximal sesamoid bones fracture. The injuries resulted in loss of support of the fetlock joint of the right forelimb. Chronic lesions affecting the origin (severe high suspensory desmitis), body (severe, extensive core lesion') and both branches (severe desmitis) ultimately caused the suspensory apparatus breakdown. The fracture of the proximal sesamoid bones is a consequence of chronic, biaxial, apical stress remodeling, which is present in contralateral limb. Furthermore, the horse suffered from severe bilateral bone remodeling within the medial splint bones ('blind splint') (most probably was caused by injury to the interosseous and suspensory ligament) and dorsal metacarpal disease (slightly more advanced in the left forelimb).

02/07/19 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: biaxial proximal sesamoid bone fractures with associated suspensory apparatus damage; fetlock dropping and partial luxation; injury occurred in race 2/03/19 and horse was kept in Kimzey splint up until euthanasia.

## Gross Observations

Necropsy of a 3 year old [redacted] Thoroughbred [redacted], 430 kg, with [redacted] and tattoo [redacted] is commenced at 8:32 am, February 7, 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 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 along the margo plicatus is mildly hyperkeratotic. 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 chestnut. Following changes were seen:

RIGHT FRONTLIMB

A- PROXIMAL SESAMOID BONES
1. Closed, biaxial, comminuted, articular, transverse, displaced, apical fracture of the proximal sesamoid bones
2. Moderate scoring of the articular surfaces of the proximal sesamoid bones

B- SOFT TISSUES
1. Suspensory ligament failure with severe, incomplete rupture, severe fraying (especially on the dorsal surface) and thick layer of yellow connective tissue firmly adhered to the palmar surface of both branches. The fraying, edema and hemorrhage expands all the way to the proximal third, including the suspensory origin (high suspensory desmitis). The multiple cross sections through the body revealed defect (discolored, yellow, presumably 'core lesion' affecting app. 60-70% of cross sectional area) extending roughly from the bifurcation to the proximal third.
2. Full thickness, transverse rupture of the intersesamoidean ligament following the fracture line of the medial and lateral proximal sesamoid bones

C- MCIII
1. Mild dorsal metacarpal disease with periosteal thickening and congestion and multifocal, dark pink discoloration of the cortical bone in the dorsal proximal third of the cannon bone. The cross section of the mid-shaft revealed subtle pink discoloration alone the dorsal cortex created by petechiae.

D- MCII
1. Severe, extensive outgrowth of the medial splint bone ('blind splint')- the exostosis is app. 7 cm long and the widest part (app. 2cm x 1cm in diameter) is located at the level of the mid-shaft, where the abaxial part of the bone is completely fused with cannon bone. Between the abaxial part and MCIII the interosseous ligament is present as white, fibrous connective tissue (seems to be moderately thickened). Approximately, at the level of the mid-shaft, the cross section revealed sagittal crack coursing through the middle of the expanded splint bone. At this stage defect is filled with beige, soft material (necrotic debris?), which is surrounded by red petechiae and from the palmar aspect the rim of highly compacted trabecular bone (sclerotic bone).

E- P1
1. Moderate scoring of the proximal articular surface of P1
2. Mild lipping with red discoloration of the palmar margin of the proximal articular surface of P1

LEFT FRONTLIMB

A- RADIUS
1. Chip fracture with cartilage ulceration along the fractured fragment of the cranial margin of the intermediate facet of the distal articular surface of radius

B- CARPUS
1. Mild, shallow, cartilage ulceration/irregularity along the dorsal margin of the proximal articular surface of the intermediate carpal bone

C- PROXIMAL SESAMOID BONES
1. Severe, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
2. Moderate scoring lines of the articular surface of the proximal sesamoid bones
3. Moderate synovial hyperplasia with red discoloration underneath the bases of the proximal sesamoid bones (proliferative synovitis)

D- MCIII
1. Mild to moderate dorsal metacarpal disease with slight convex appearance of the dorsal cortex (extending from the mid-shaft to the proximal third), mild periosteal thickening and congestion. The cross section of the mid-shaft revealed red rim of discoloration created by petechiae underlying the 2-3 mm thick, layer of the expanded cortical bone, which appears to be highly compacted/sclerotic.

2. Moderate, uniaxial palmar osteochondral disease with blue, focal subchondral bone discoloration visible through the cartilage and centrally located cartilage depression (pinpoint, ca. 0.1cm in diameter) of the flattened lateral condyle of the distal articular surface of MCIII
3. Mild scoring of the distal articular surface of MCIII
4. Mild transverse ridge arthrosis with cartilage pitting and fibrillation
5. Mild hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
6. Mild hemorrhage with bone erosion due to compression caused by hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MCIII

E- MCII
1. Severe, extensive outgrowth of the medial splint bone ('blind splint')- the exostosis is app. 6 cm long and the widest part (app. 2cm x 1cm in diameter) is located at the level of the mid-shaft, where the abaxial part of the bone is completely fused with cannon bone. Between the abaxial part and MCIII, the interosseous ligament is present as white, fibrous connective tissue, which is surrounded by thin rim of brownish petechiae.

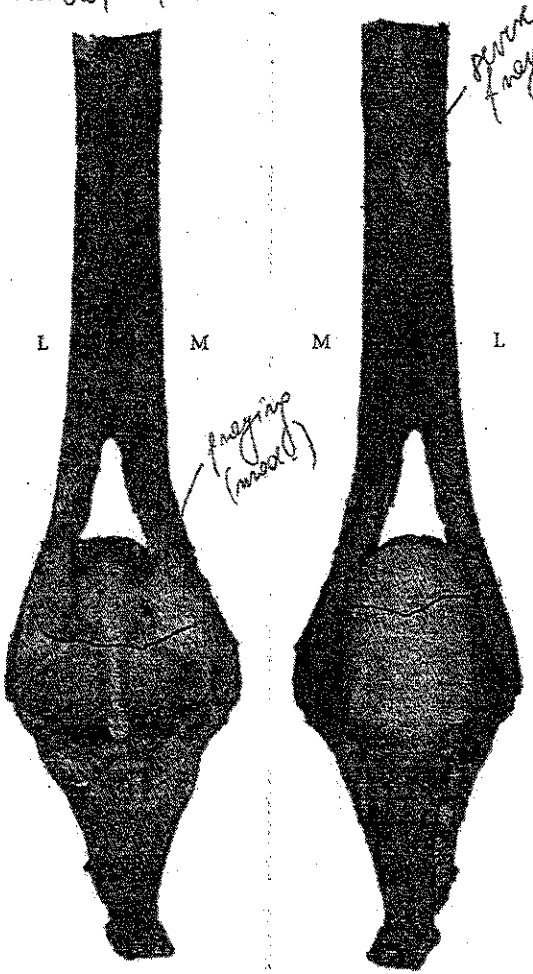
F- P1
1. Mild lipping of the dorsal margin of the proximal articular surface of P1
2. Moderate scoring of the proximal articular surface of P1
3. Mild, biaxial, focal, cartilage ulceration of the dorsal aspect of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other bones of both distal front limbs examined from the chestnut to the hoof.

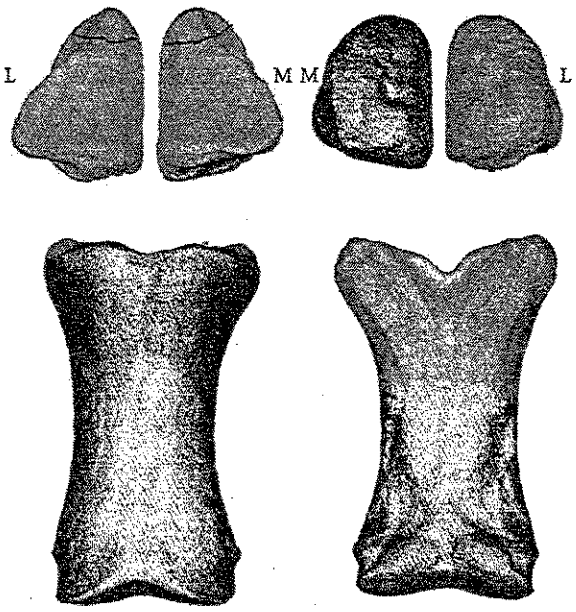
Accession # [redacted]
CC: MAS
Date: 02/12/19

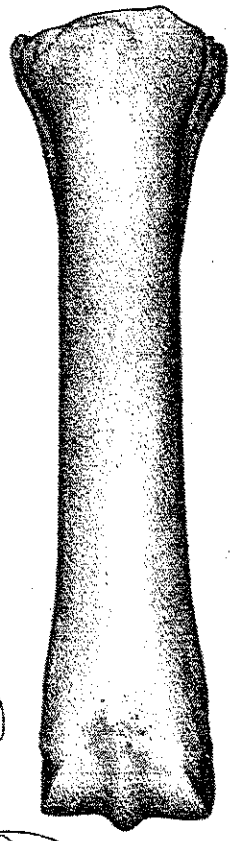
Right Fetlock

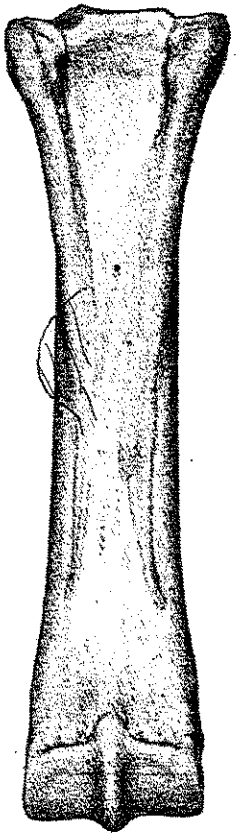
Please circle affected leg
foreleg
hindleg




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)

Intersesamoidean ligament : (Yes) No
Longitudinal (Transverse)

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

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: Yes (No)

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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

**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 2/6/2019 1:40:40PM

**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:** 01/23/2019 **Date Received:** 01/23/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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] |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | DOWD, JOSEPH | 818-400-7498 | Po Box 661956 | Arcadia | CA | 91066 |
| Trainer | Lucarelli, Frank | 253-740-0527 | 526 Victor St. | Auburn | WA | 98002 |

## CHRB - Related Information

Horse's Name: [redacted]
Tattoo: [redacted]
Age: 4.00 Years
Gender: Neutered Male
Taxonomy: Thoroughbred Horse

Human Injury?
Death Related to: Training
Track Surface: Dirt
Location on Track: Finish line
Insured?

Medications: Pentobarbital; Rompun (Xylazine);

## Laboratory Findings/Diagnosis

A 4 year old [redacted] Thoroughbred [redacted] [redacted]) submitted with a history of left hind open condylar fracture and possible sesamoid fractures

Catastrophic left hind fetlock breakdown with

LEFT HINDLIMB

ACUTE CHANGES
1. Open, simple, complete, displaced, articular, oblique, parasagittal, lateral condylar fracture of the MTIII with the presence of pre-existing lesion (biaxial plantar osteochondral disease, see chronic changes 1.)
2. Open, biaxial, comminuted, complete, transverse, articular, apical fracture of the proximal sesamoid bones with avulsion fracture component off the axial aspect of the lateral proximal sesamoid bone
3. Open, simple, complete, non-displaced, articular, parasagittal, chip fracture of the proximal lateral plantar eminence of P1

4. Severe scoring of the articular surfaces of the proximal sesamoid bones
5. Severe, full thickness cartilage loss of axial aspect of the articular surface of the lateral proximal sesamoid bone
6. Suspensory apparatus 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, transverse rupture of the plantar annular ligament
9. Full thickness, longitudinal and transverse rupture of the intersesamoidean ligament
10. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
11. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones
12. Moderate fraying of fibers of the medial and collateral ligaments of fetlock
13. Severe, longitudinal, full-thickness split and fraying of fibers of the straight distal sesamoidean ligament
14. Moderate fraying of fibers and hemorrhage of the dorsal surface of the superficial and deep digital flexor tendons
15. Severe scoring the distal articular surface of MTIII
16. Severe scoring of the proximal articular surface of P1
17. Moderate to severe cartilage erosion of the dorsal and plantar margins of the proximal articular surface of P1

CHRONIC CHANGES:
1. Severe, biaxial plantar ostechondral disease with blue, subchondral bone discoloration visible through the cartilage of the medial condyle and brown, focal discoloration and lysis of the subchondral bone visible on both opposing surfaces accompanied by focal collapse of subchondral bone and the overlying cartilage of the fractured lateral condyle of the distal MTIII

RIGHT HINDLIMB

CHRONIC CHANGES
Moderate osteoarthritis of the fetlock joint
1. Moderate plantar ostechondral disease with focal, uniaxial, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MTIII
2. Moderate , biaxial, longitudinal fissures in the cartilage of the parasagittal grooves of the distal articular surface of MTIII
3. Moderate to severe, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
4. Moderate to severe, uniaxial, basilar, irregular bony outgrowth (osteophytosis) of the lateral proximal sesamoid bone
5. Moderate, biaxial, pink to violet, focal, transverse subchondral bone discoloration visible through the cartilage overlying the bases of the proximal sesamoid bones
6. Mild to moderate, focal, grey subchondral bone discoloration visible through the cartilage along the abaxial margins of the proximal sesamoid bones
7. Moderate, biaxial, red cartilage discoloration adjacent to the sagittal groove of the proximal surface of P1
8. Moderate lipping of the dorsal and plantar aspect of the proximal articular surface of P1

Other findings
- Moderate, multifocal gastric hyperkeratosis with mild, multifocal, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

02/04/19 The most important findings in the left hindlimb are lateral condylar fracture of cannon bone, biaxial, apical fracture of proximal sesamoid bones, chip fracture of proximal phalanx and suspensory apparatus failure. The latter injuries resulted in loss of support of the fetlock joint of the left hindlimb.
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 left canon bone.

01/24/19 No significant findings were identified in visceral organs. At the time of necropsy, both hind 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

Left hind: MTIII condylar fracture (open) w/possible biaxial sesamoid fractures; horse reportedly working (last race 12/31/18, no

works in-between); * assistant trainer reports history of right hind tibial stress injury (date not specified).

## Gross Observations

Necropsy of a 4 year old, [redacted] Thoroughbred [redacted] ([redacted]), 522 kg, with a [redacted] is commenced at 1:40 pm, January 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 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 along the margo plicatus is moderately hyperkeratotic with multifocal (app. 0,5 cm - diameter), shallow ulcers. The intestinal tract is unremarkable, and the small colon contains formed feces.
Both hind limbs are removed at the level of the chestnut for further examination.

## CHRB Musculoskeletal

Both hind limbs were examined distally from the mid-shaft of tibia. Following changes were seen:

LEFT HIND
A- MTIII
1. Open, simple, complete, displaced, articular, oblique, parasagittal, lateral condylar fracture of the MTIII with the presence of pre-existing lesion

The lateral condylar fragment is app. 7 cm long. The condylar fracture is coursing through blue subchondral bone discoloration. The opposing surfaces of the fracture reveal focus of dark red/ brown discoloration of increased bone porosity (osteopenic focus) surrounded by highly compacted/sclerotic bone accompanied by clearly visible subchondral bone and cartilage collapse.

2. Severe scoring with very wide vertical clefts, especially affecting the sagittal ridge of the distal articular surface of MTIII
3. Severe hemorrhage accompanied by soft tissue hypertrophy at the plantar aspect of the supracondylar region of MTIII
4. Severe hemorrhage and bone erosion due to hypetrophic synovial pad at the dorsal aspect of the supracondylar region of MTIII
5. Severe, biaxial plantar ostechondral disease with blue, subchondral bone discoloration visible through the cartilage of the medial condyle and brown, focal discoloration with lysis of the subchondral bone visible on both opposing surfaces accompanied by focal collapse of subchondral bone and the overlying cartilage of the fractured lateral condyle of the distal MTIII. The blue discoloration (bruising) of the subchondral bone of the medial condyle is not that apparent, is subtle and smaller in diameter, with centrally located, short (app. 0.2cm) cartilage fissures.

B- PROXIMAL SESAMOID BONES
1. Open, biaxial, comminuted, complete, transverse, articular, apical fracture of the proximal sesamoid bones
a) Medial proximal sesamoid bone- the apical fragment is severely comminuted into multiple small fragments
b) Lateral proximal sesamoid bones- the small apical fragment is avulsed with lateral branch of the suspensory ligament. The axial fracture component is avulsed with interesesamoidean ligament. The latter fragment is divided into 3 pieces (roughly equal), firmly attached to the ligament. There is also extensive cartilage loss along the axial fracture line.
2. Severe scoring of the articular surfaces of the proximal sesamoid bones

C- P1
1. Open, simple, complete, non-displaced, articular, parasagittal, chip fracture of the proximal lateral plantar eminence of P1
2. Severe scoring of the proximal articular surface of P1
3. Moderate to severe cartilage erosion of the dorsal and plantar margins of the proximal articular surface of P1

D- SOFT TISSUES
1. Severe, multiple, complete longitudinal splits of the medial branch of the suspensory ligament progressing to the level app. 2-3 cm above the bifurcation, where it progresses further proximally as incomplete splits up to proximal third of the body of the suspensory ligament, mainly affecting its plantar surface.
2. 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
3. Full thickness, transverse rupture of the plantar annular ligament
4. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
5. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones

6. Moderate fraying of fibers of the medial and collateral ligaments of fetlock
7. Moderate fraying of fibers and hemorrhage of the medial edge of the dorsal surface of the superficial and deep digital flexor tendons
8. Severe synovial hypertrophy with red discoloration underneath the bases of the proximal sesamoid bones
9. Severe synovial thickening in the fetlock joint (proliferative synovitis)

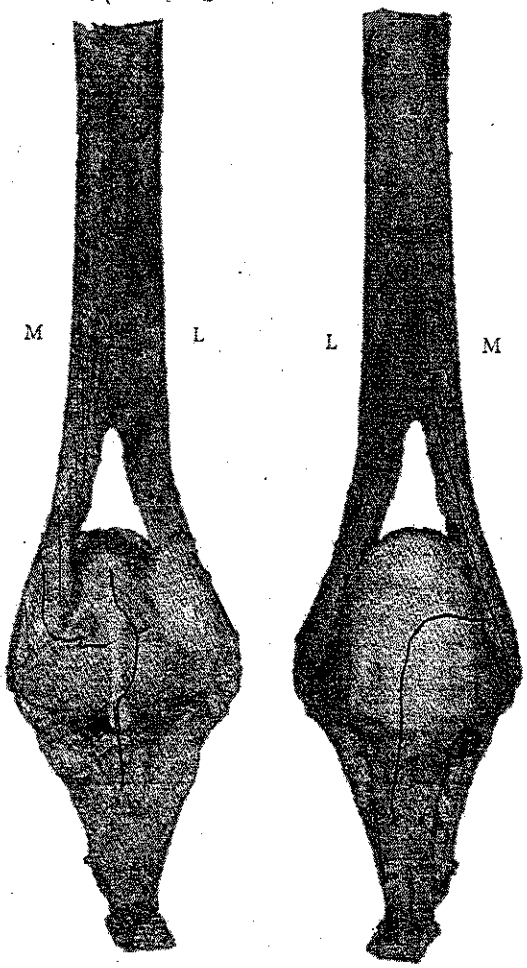
RIGHT HIND
A- PROXIMAL SESAMOID BONES
1. Moderate to severe, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
2. Moderate to severe, uniaxial, basilar, irregular bony outgrowth (osteophytosis) of the lateral proximal sesamoid bone
3. Moderate, biaxial, pink to violet, focal, transverse subchondral bone discoloration visible through the cartilage overlying the bases of the proximal sesamoid bones
4. Mild to moderate, focal, grey subchondral bone discoloration visible through the cartilage (app. 1.5 cm long) along the abaxial margins of the proximal sesamoid bones. The discoloration of the medial proximal sesamoid bone appears to be slightly darker, and also has few focal pinpoints of depressed cartilage

B- MTIII
1. Moderate plantar ostechondral disease with focal, uniaxial, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MTIII
2. Moderate , biaxial, longitudinal fissures in the cartilage of the parasagittal grooves of the distal articular surface of MTIII

C- SOFT TISSUE
1. Moderate synovial thickening in the fetlock joint (proliferative synovitis)
D- P1
1. Moderate, biaxial, red cartilage discoloration adjacent to the sagittal groove of the proximal surface of P1
2. Moderate lipping of the dorsal and plantar aspect of the proximal articular surface of P1
3. Mild, biaxial, focal shallow ulceration with fibrillation of the cartilage of the dorsal margin of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other bones of both distal hind limbs examined from the mid-shaft of tibia.

Accession # [redacted]
CC: MAS
Date: 02/01/19



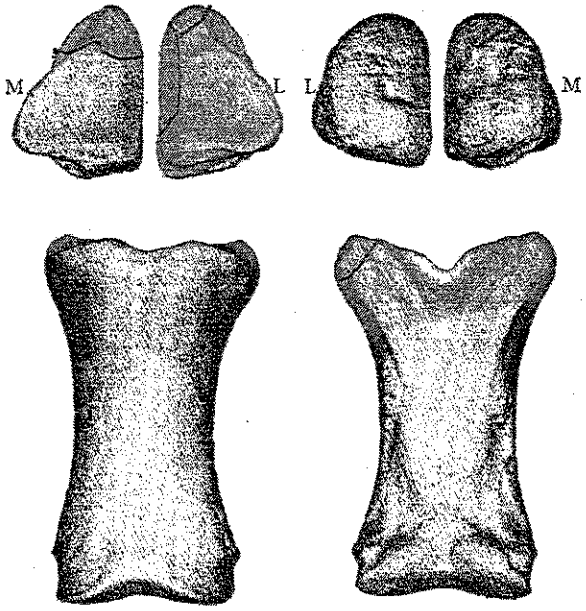

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? (Yes) No

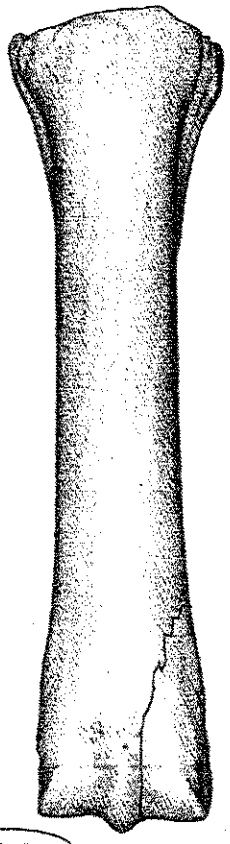
Joint capsule intact? Yes (No)

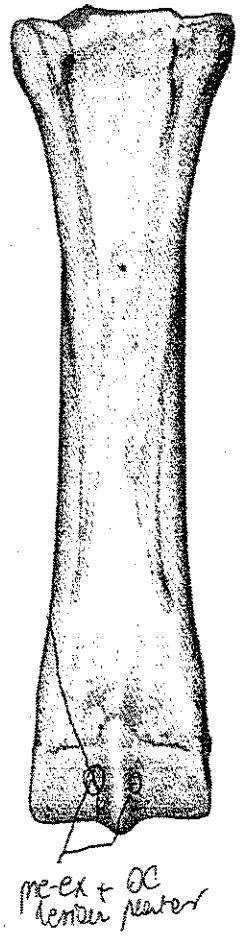
Joint luxated? Yes (No)

Left Fetlock




Please circle affected leg
foreleg
(hindleg)






**Involved Structures**

SDF tendon: Yes (No) DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) SL Lateral branch (SL Body)

Intersesamoidean ligament: (Yes) No

(Longitudinal) (Transverse)

Distal Sesamoidean ligaments: (Yes) No (straight and/or oblique)

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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**CAHFS Accession #:** [redacted]
**Addendum Version 1**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/19/2019 9:17:36AM

**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:** 01/11/2019 **Date Received:** 01/13/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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] |
| Owner | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfs! | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Birch, Sarah | 626-783-1237 | Po Box 661956 | Arcadia | CA | 91066 |
| Trainer | GOMEZ, RUBEN | 626-353-9462 | 11101 Summit Trail | Sylmar | CA | 91342 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 4.00 Years | Track Surface: | Dirt |
| Gender: | Female | Location on Track: | |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

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

## Laboratory Findings/Diagnosis

A 4 year old [redacted] Thoroughbred [redacted] [redacted]) submitted with a history of right front biaxial sesamoid bone fracture with suspensory apparatus failure and disarticulation of metacarpohalangeal joint

Catastrophic breakdown of right front fetlock with

RIGHT FRONT
ACUTE CHANGES
1. Fracture of the proximal sesamoid bones (PSB), likely associated with a focal area of subchondral porosity/osteopenia at the fracture surface of the medial proximal sesamoid bones, with:
a) Open, articular, mid-body, simple, transverse fracture of the lateral proximal sesamoid bone
b) Open, articular, mid-body, comminuted, transverse fracture of the medial proximal sesamoid bone
2. Complete, open luxation of the fetlock joint with lateral displacement of the distal MCIII

3. Full thickness, transverse rupture of the palmar annular ligament
4. Full thickness, transverse rupture of the intersesamoidean ligament
5. Severe fraying of fibers of the short and cruciate ligaments
6. Severe fraying of fibers and complete transverse rupture of the lateral collateral ligaments of fetlock
7. Severe fraying of fibers and complete longitudinal rupture of the collateral ligaments of the proximal sesamoid bones
8.Severe fraying of fibers and complete, multiple longitudinal splits of the lateral and medial branches of the suspensory ligament
9. Severe, two foci of full thickness cartilage loss of the distal articular surface of MCIII
10. Moderate scoring of the distal articular surface of MCIII
11. Moderate scoring of the proximal articular surface of P1
12. Severe erosion of the palmar margins of the proximal articular surface of P1

CHRONIC CHANGES:
1. Irregular periosteal proliferation/exostosis on the palmar aspect of the mid-MCIII
2. Moderate, focal, biaxial, red cartilage discoloration adjacent to the mid-sagittal ridge and transverse ridge accompanied by mild to moderate fibrillation and cartilage pitting
3. Mild to moderate lipping of the dorsal aspect of the proximal articular surface of P1

LEFT FORELIMB
CHRONIC CHANGES
1. Moderate, focal, rounded, grey subchondral bone discoloration with subtle cartilage fibrillation located in the middle of the abaxial margin of the medial proximal sesamoid bone (location analogous to the pre-existing lesion in proximal sesamoid bone in contralateral limb)
2. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones
3. Irregular periosteal proliferation/exostosis on the palmar aspect of the mid-MCIII
4. Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1
5. Irregular, osteochondral outgrowth of the dorsal articular margin of the distal articular surface of radial (severe, with chip fracture) and intermediate carpal bones (mild to moderate)
6. Moderate lipping and cartilage pitting and irregularities along the dorsal articular margin of the proximal articular surface of third carpal bone

Other findings:
- Mild to moderate, multifocal gastric hyperkeratosis of non-glandular mucosa along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

03/19/19 Case was re-opened due to minor corrections in diagnosis and CHRB Musculoskeletal field (typographical errors). Further testing is concluded.

01/19/19 The most important findings in the right forelimb is biaxial fracture of the proximal sesamoid bones. The injuries of the proximal sesamoid bones 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 medial proximal sesamoid bone. Changes of similar nature could be located in the proximal sesamoid bones in contralateral limb.

01/13/18 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: suspensory apparatus failure, disarticulation metacarpophalangeal joint, biaxial proximal sesamoid bone fractures; injury was originally closed but was rendered open when removed from equine ambulance; horse also sustained laceration on ventral midline pectoral region (horse fell during running of race).

## Gross Observations

Necropsy of a 4 year old, [redacted] Thoroughbred [redacted] ([redacted]), 407 kg, with [redacted], tattoo [redacted] is

commenced at 10:35 am, January 13, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in moderate 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 along the margo plicatus is mildly to moderately hyperkeratotic. 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 chestnut. Following changes were seen:

RIGHT FRONT
A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones (PSB)
a) Open, articular, mid-body, simple, transverse fracture of the lateral proximal sesamoid bone
b) Open, articular, mid-body, comminuted, transverse fracture of the medial proximal sesamoid bone
A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The distal opposing surface is comminuted within the region of discoloration. The fracture line propagates through subchondral focus of marked dark red/brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The distal opposing surface is comminuted within the region of discoloration. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the abaxial surface/lateral suspensory branch insertion appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.
For better visualization of described fractures, please see attached pictures and drawings.
2. Severe scoring of the articular surfaces of the proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse rupture of the palmar annular ligament
2. Full thickness, transverse rupture of the intersesamoidean ligament, roughly in the middle, following the fracture line affecting proximal sesamoid bones
3. Complete, open luxation of the fetlock joint with lateral displacement of the distal MCIII
4. Mild fraying of fibers of the dorsal surface of the deep digital flexor tendon at the level of the fetlock
5. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
6. Severe fraying of fibers and complete transverse rupture of the lateral collateral ligaments of fetlock
7. Severe fraying of fibers and complete longitudinal rupture of the collateral ligaments of the proximal sesamoid bones
8. Mild, biaxial fraying of the distal oblique sesamoidean ligaments
9. Mild fraying of the distal straight sesamoidean ligament
10. Severe fraying of fibers and complete, multiple longitudinal splits of the lateral and medial branches of the suspensory ligament- splits propagate all the way up from the insertion on the proximal sesamoid bone to bifurcation of the suspensory ligament. Both branches are attached to the body of the suspensory ligament only with few fibers. Lateral branch seems to be slightly more affected in comparison to the medial.

C- MCIII
1. Irregular periosteal proliferation/exostosis (prominent, 2 cm x 0.5-1 cm) on the palmar aspect of the mid-MCIII (app. 0.5 cm underneath the bifurcation of the suspensory ligament)
2. Severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
3. Severe hemorrhage and soft tissue erosion with bone exposure at the dorsal aspect of the supracondylar region of MCIII
4. Severe, extensive, full thickness cartilage loss of the dorsomedial articular margin of the distal articular surface of MCIII
5. Moderate, focal, biaxial, red cartilage discoloration adjacent to the mid-sagittal ridge and transverse ridge accompanied by mild to moderate fibrillation and cartilage pitting
6. Moderate, focal, rounded (app. 0.2 cm in diameter) full thickness cartilage loss in the middle of mid-sagittal ridge of the distal articular surface of MCIII

D- P1
1. Mild to moderate scoring of the proximal articular surface of P1
2. Severe erosions of axial margins of the palmar eminences of the proximal articular surface of P1 (medial palmar eminence is

slightly more affected)
3. Moderate, focal, transverse cartilage ulceration along the dorsomedial margin of the proximal articular surface of P1
4. Mild to moderate lipping of the dorsal margin of the proximal articular surface of P1
LEFT FRONT

A- CARPUS
1. Irregular, osteochondral outgrowth of the dorsal articular margin of the distal articular surface of radial (severe, with chip fracture) and intermediate carpal bones (mild to moderate)
2. Moderate lipping and cartilage pitting and irregularities along the dorsal articular margin of the proximal articular surface of third carpal bone

B- PROXIMAL SESAMOID BONES
1. Moderate, focal, rounded, grey subchondral bone discoloration with subtle cartilage fibrillation located in the middle of the abaxial margin of the medial proximal sesamoid bone (location analogous to the pre-existing lesion in proximal sesamoid bone in contralateral limb)
2. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones

C- MCIII
1. Irregular periosteal proliferation/exostosis (prominent, 1.5 cm x 0.5 cm) on the palmar aspect of the mid-MCIII (app. 0.5 cm underneath the bifurcation of the suspensory ligament)- comparable to the exostosis on the contralateral limb, only minimally smaller in size
2. Mild to moderate hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
3. Mild to moderate hemorrhage and soft tissue erosion with bone exposure at the dorsal aspect of the supracondylar region of MCIII

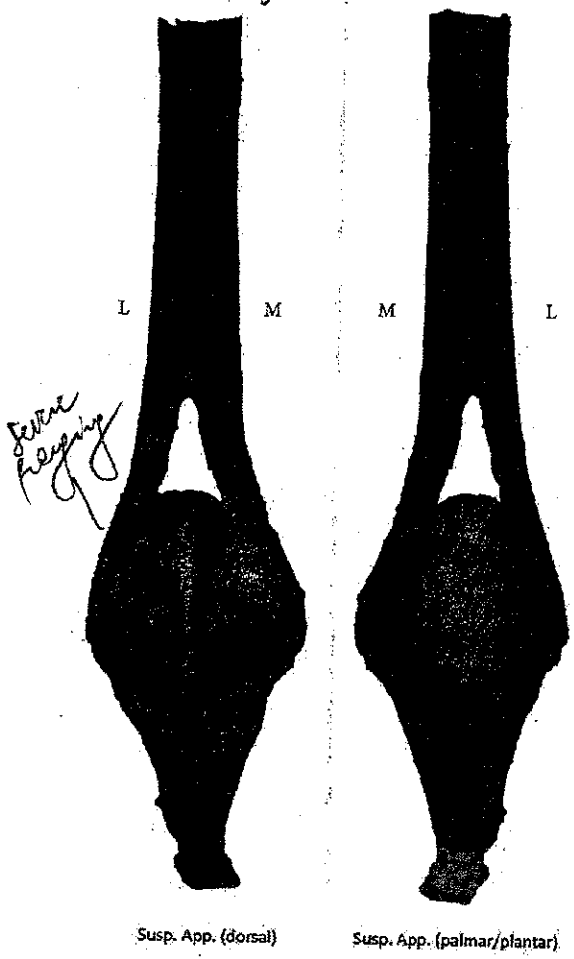
D- P1
1. Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1
2. Mild, biaxial, transverse, subtle cartilage ulceration along the dorsal margin of the proximal surface of P1

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

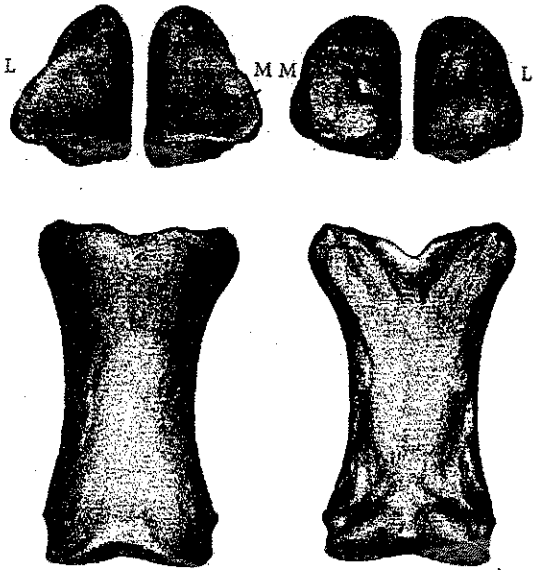
Accession # [redacted]
CC: MAS
Date: 1/18/19

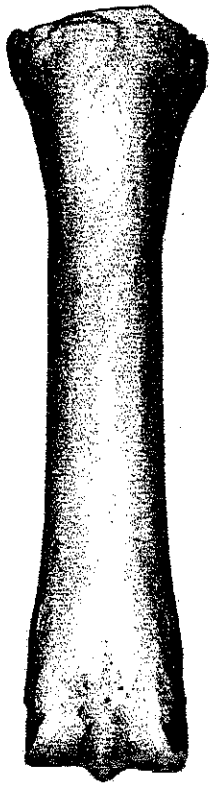
Right Fetlock

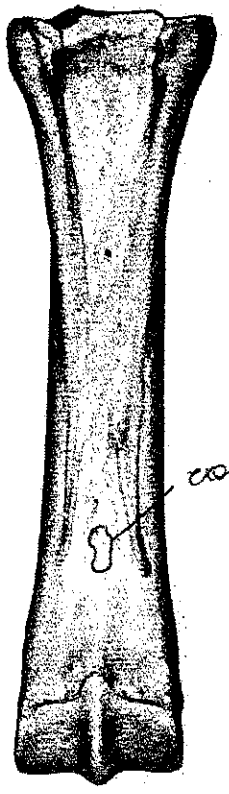
Please circle affected leg
(foreleg)
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)





**Involved Structures**

SDF tendon: Yes (No) DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) SL (Lateral branch) SL Body

Intersesamoidean ligament : (Yes) No
Longitudinal (Transverse)

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

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments: (Yes) No

Open wound? (Yes) No

Joint capsule intact? Yes (No)

Joint luxated? (Yes) No

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**CAHFS Accession #:** [redacted]
**Addendum Version 1**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/15/2019 12:26:53PM

**Email To:**
Baker, Rita L
RitaB@chrb.ca.gov

**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:** 03/02/2019 **Date Received:** 03/04/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | Baker, Rita L | 916-263-6038 | 1010 Hurley Way, Suite #300 | Sacramento | CA | 95825 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Birch, Sarah | 626-783-1237 | Po Box 661956 | Arcadia | CA | 91066 |
| Trainer | GUTIERREZ, JORGE | 626-203-8690 | 1623 Brycedale | Arcadia | CA | 91007 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 4.00 Years | Track Surface: | Dirt |
| Gender: | Female | Location on Track: | 3/8th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Banamine (Flunixin); Butazolidin (Phenylbutazone); Dormosedan (Detomidine); Lasix (Furosemide); Pentobarbital; Rompun (Xylazine);

## Laboratory Findings/Diagnosis

A 4 year old [redacted] Thoroughbred [redacted] submitted with a history of right front medial proximal sesamoid bone comminuted fracture with rupture of suspensory apparatus

Catastrophic breakdown of right front fetlock with:

RIGHT FORELIMB

ACUTE CHANGES
1. Closed, comminuted, articular, transverse, displaced, basilar/mid-body fracture of the medial proximal sesamoid bone with abaxial avulsion fracture component and possible predisposing lesion identified in abaxial aspect of the distal fracture fragment
2. Severe scoring of articular surfaces of the proximal sesamoid bones
3. Suspensory ligament failure with complete, transverse rupture of the medial branch, mild to moderate fraying of the palmar

surface of the medial branch, and moderate thickening of the body
4. Moderate fraying and hemorrhage of the palmar surface of the deep digital flexor tendon
5. Severe, full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
6. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
7. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
8. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
9. Severe, extensive, full thickness cartilage loss of the medial condyle of the distal articular surface of MCIII
10. Severe scoring of the distal articular surface of MCIII
11. Severe scoring of the proximal articular surface of P1

LEFT FORELIMB

CHRONIC CHANGES
1. Moderate, focal, blue subchondral bone discoloration visible through the cartilage on the abaxial aspect of the medial proximal sesamoid bone (analogous location as the pre-existing lesion in medial proximal sesamoid bone in fractured limb)
2. Moderate, focal, blue subchondral bone discoloration visible through the cartilage of the dorsal aspect of the mid-sagittal ridge of the distal articular surface of distal MCIII
3. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones

Other findings:
- Mild, shallow gastric ulceration of non-glandular mucosa along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

03/08/19: The most important findings are fracture of the medial proximal sesamoid bones and complete rupture of the medial branch of suspensory ligament of the right forelimb. The latter injuries resulted in loss of support of the fetlock joint in the right forelimb. The aforementioned fractures may be related to the focal region of discoloration and bone porosity/osteopenic focus associated with the distal fracture surface in the medial proximal sesamoid bone. Furthermore, changes of similar nature were identified in the proximal sesamoid bones in contralateral limb.

03/04/19 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: comminuted medial proximal sesamoid bone fracture with rupture of the suspensory apparatus.
Track surface was sealed/sloppy.

## Gross Observations

Necropsy of a 4 year old, chestnut Thoroughbred [redacted] 525 kg, with [redacted], tattoo [redacted] is commenced at 9:40 am, March 4, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in moderate 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 has very shallow and small (app. 0.5cm long) 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 FRONT

A- PROXIMAL SESAMOID BONES

1. Fracture of the proximal sesamoid bone
a) Closed, comminuted, articular, transverse, displaced, basilar/mid-body fracture of the medial proximal sesamoid bone with abaxial avulsion fracture components, and probable predisposing lesion identified in abaxial aspect of the distal fracture fragment – The proximal fracture segment is divided into four fragments. Two of them are avulsed with medial branch of suspensory ligament. Other two are wedge shaped, loose fragments at the mid-body. A possible region of increased porosity is present at the abaxial aspect of the distal fracture surface of the medial proximal sesamoid bone. The fracture line propagates through a subchondral focus of red discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral and trabecular bone is highly compacted (sclerotic) on both opposing surfaces of the fracture.
For better visualization of described fractures, please see attached pictures and drawings.

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament rupture with short sagittal component affecting straight distal sesamoidean ligament- 'F' shaped; the tear follows the main fracture line of the proximal sesamoid bones
2. Suspensory ligament failure with complete, transverse rupture of the medial branch, mild to moderate fraying of the palmar surface of the medial branch and moderate thickening and dark red discoloration visible on the cross section of the body
3. Moderate to severe proliferative synovitis of the fetlock joint
4. Moderate fraying and hemorrhage of the palmar surface of the deep digital flexor tendon at the level of the fetlock
5. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
6. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
7. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones

C- MCIII
1. Severe, extensive, full thickness cartilage loss of the medial condyle of the distal articular surface of MCIII- palmar to the transverse ridge the cartilage is completely degenerated
2. Severe scoring of the distal articular surface of MCIII with multiple clefts of variable depth and width
3. Severe hemorrhage accompanied by soft tissue proliferation at the palmar aspect of the supracondylar region of MCIII
4. Severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

D- P1
1. Severe scoring lines of the proximal articular surface of P1
2. Mild lipping of the dorsal and palmar margins of the proximal articular surface of P1
3. Mild, shallow, biaxial cartilage erosion of the dorsal margins of the proximal articular surface of P1

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1. Moderate, focal, blue subchondral bone discoloration visible through the cartilage of the abaxial aspect of the medial proximal sesamoid bone -analogous location as the pre-existing lesion in medial proximal sesamoid bone in fractured limb
2. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones

B- SOFT TISSUES
1. Moderate proliferative synovitis and hemarthrosis of the fetlock joint

C- MCIII
1. Moderate, focal, blue subchondral bone discoloration visible through the cartilage of the dorsal aspect of the mid-sagittal ridge of the distal articular surface of distal MCIII
2. Moderate scoring of the distal articular surface of MCIII

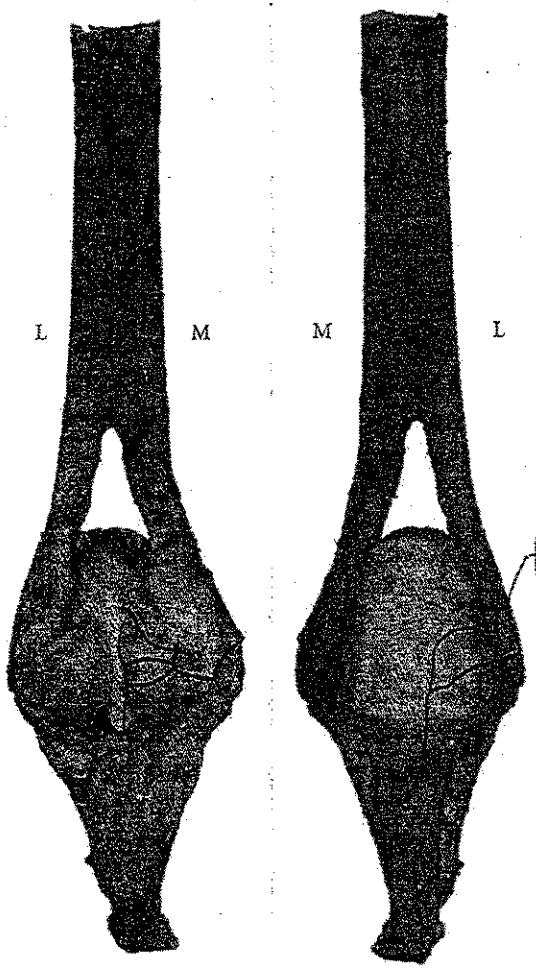
D- P1
1. Mild to moderate lipping of the dorsal aspect of the proximal articular surface of P1
2. Mild scoring of the proximal articular surface
3. Mild, biaxial, shallow cartilage erosions of the dorsal margin of the proximal surface of P1

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

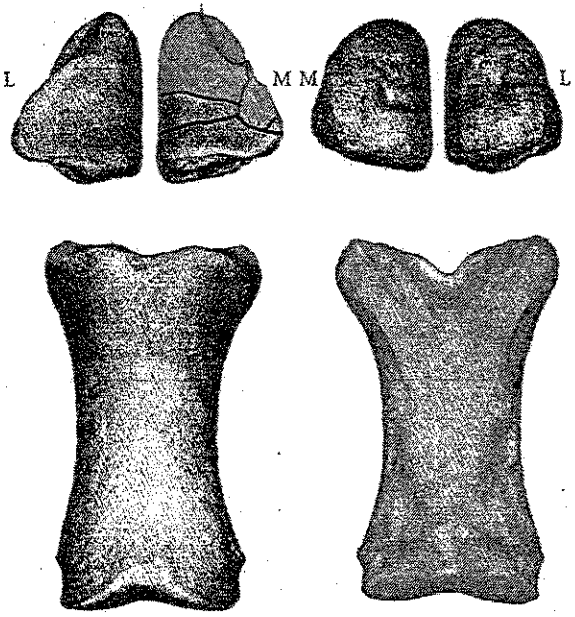
Accession # [redacted]
CC: MAS
Date: 03/11/19

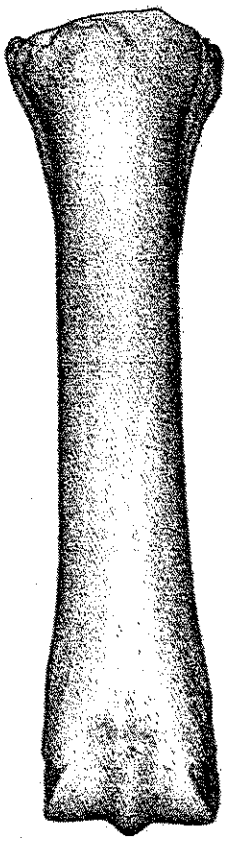
Right Fetlock

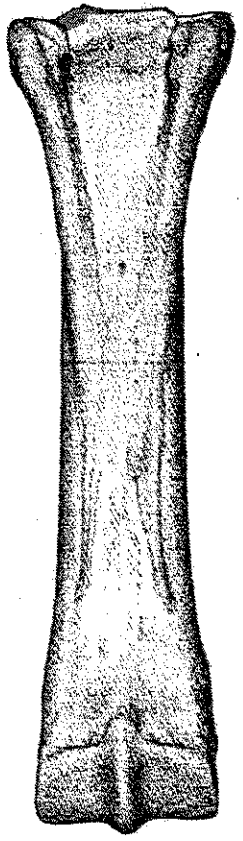
Please circle affected leg
foreleg
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)





**Involved Structures**

SDF tendon: Yes (No) DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) SL Lateral branch SL Body

Intersesamoidean ligament : (Yes) No
(Longitudinal) (Transverse)

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

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: Yes (No)

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? Yes (No)

Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

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VETERINARY MEDICINE
105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
www.cahfs.ucdavis.edu

**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 | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | McAfoos, Jessie | 618-927-0908 | 730 Orange | Sierra Madre | CA | 91024 |
| Trainer | HANSON, RYAN | 208-241-7295 | 142 E. Cherry Ave. | 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]) 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 ostechondral 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] 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 ostechondral 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 palamar ostechondral 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 # [redacted]
Date 09/04/19
CC MAP

# Proximal Phalanx - Right

**Nature:**

- [x] Open
- [ ] Simple
- [x] Complete
- [x] Displaced
- [x] Articular
- [ ] Closed
- [x] Comminuted
- [ ] Incomplete
- [ ] Non-displaced
- [ ] Non-articular

**Location:**

- [x] Proximal Epiphyseal
- [x] Proximal Metaphyseal
- [x] Proximal Physeal
- [x] Diaphyseal
- [x] Distal Epiphyseal
- [x] Distal Metaphyseal
- [x] Distal Physeal

**Configuration:**

- [x] Axial (longitudinal)
- [ ] Transverse
- [ ] Segmental
- [ ] Butterfly
- [ ] Oblique

**Direction:**

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

**Pre-existing callus:**

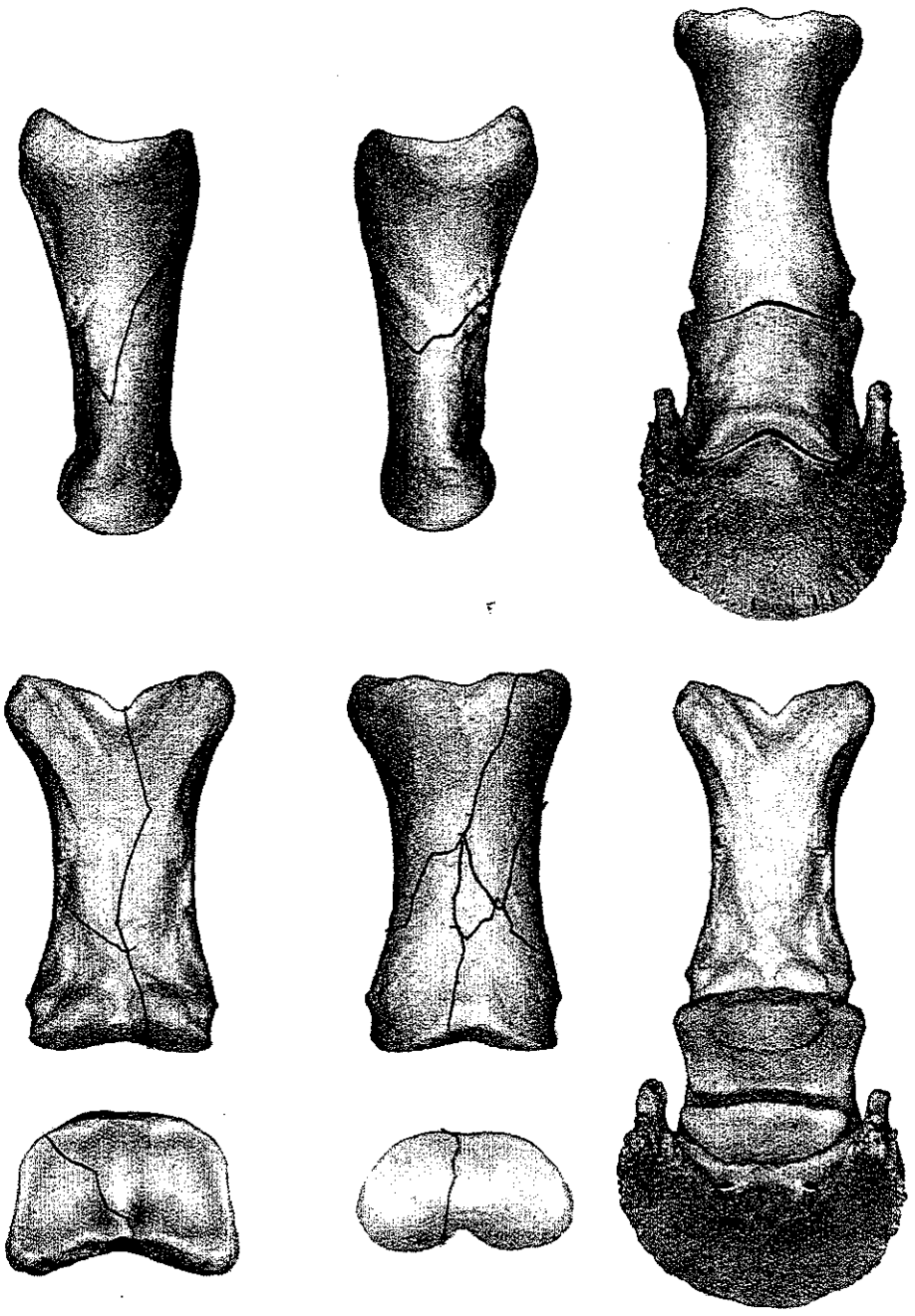
- [x] Yes
- [x] Unable to evaluate
- [ ] No

**Legend:**

Callus

Incomplete Fx

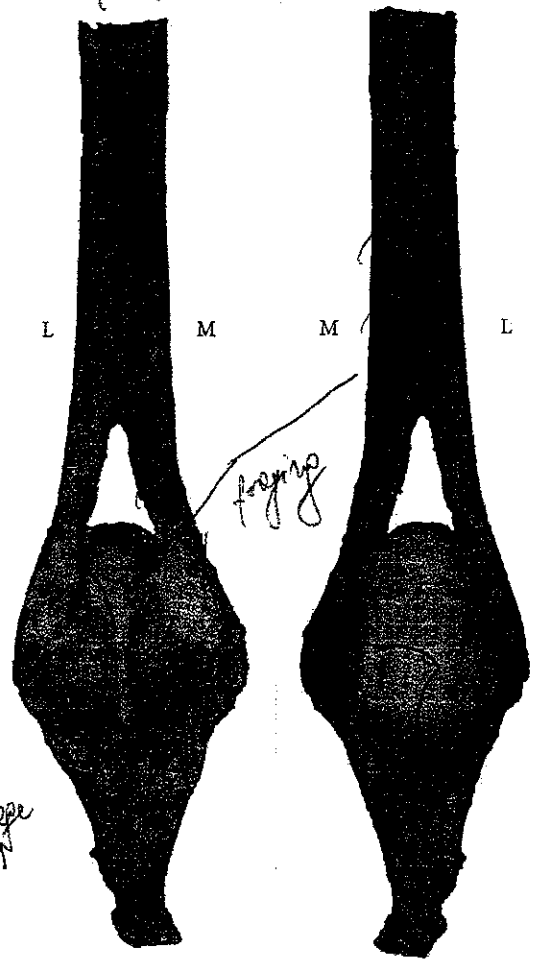
M Missing fragments

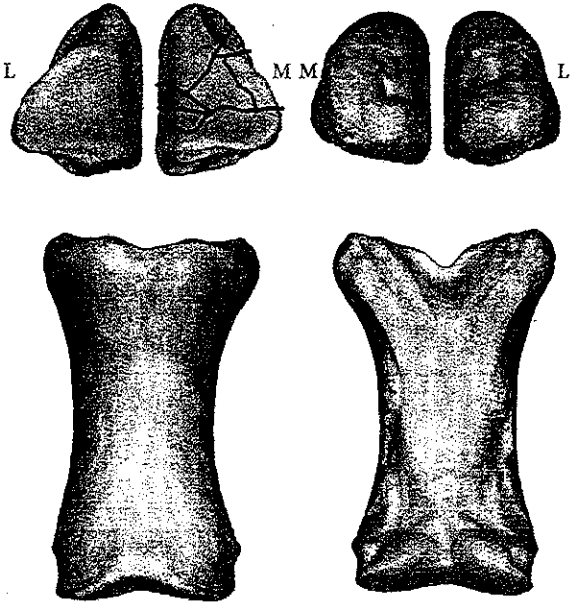


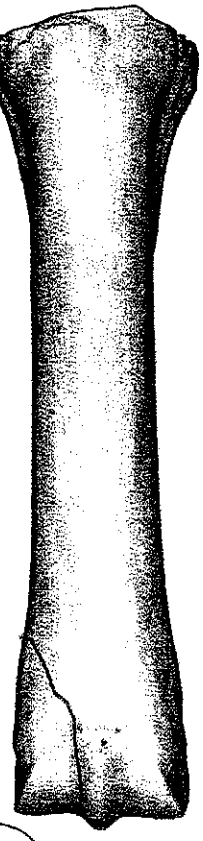
Accession # [redacted]
CC: HMS
Date: 03/04/19

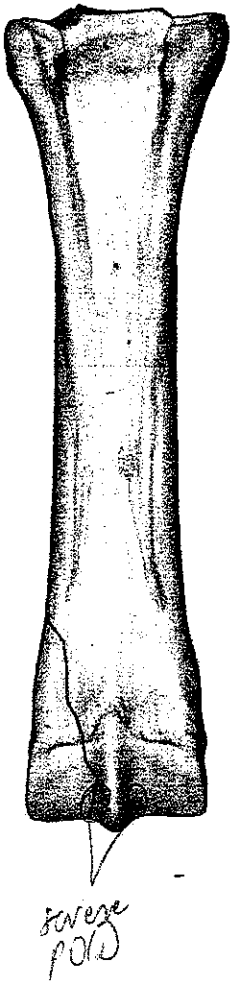
Right Fetlock

Please circle affected leg
foreleg
hindleg






**Involved Structures**

SDF tendon: Yes (No) DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) SL Lateral branch (SL Body)

Intersesamoidean ligament : (Yes) No

(Longitudinal) (Transverse)

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

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? (Yes) No

Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

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**CAHFS Accession #:** [redacted]
**Addendum Version 1**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/19/2019 9:18:07AM

**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:** 02/17/2019 **Date Received:** 02/19/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | BROKKEN, TODD | 626-862-6198 | 282 W Huntington Dr | Sierra Madre | CA | 91025 |
| Trainer | PERIBAN, JORGE | 562-290-2027 | 10333 Stamps Road | Downey | CA | 90241 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 4.00 Years | Track Surface: | Dirt |
| Gender: | Male | Location on Track: | Finish Line |
| Taxonomy: | Thoroughbred Horse | Insured? | Y |

Medications: Dormosedan (Detomidine);

## Laboratory Findings/Diagnosis

A 4 year old [redacted] Thoroughbred [redacted] [redacted]) submitted with history of right front blaxial, comminuted sesamoid fracture during training

Catastrophic breakdown of right front fetlock with

RIGHT FORELIMB

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones
a) Closed, simple, articular, oblique, displaced, apical fracture of the lateral proximal sesamoid bone with axial avulsion fracture component
b) Closed, articular, transverse, comminuted, displaced, basilar fracture of the medial proximal sesamoid bone with probable predisposing lesion

2. Suspensory ligament: complete rupture of the lateral branch and medial extensor branch, severe hemorrhage, severe fraying of fibers of both medial and lateral branches, which progresses proximally as incomplete longitudinal split up to proximal third of the body
3. Full thickness, transverse rupture of the intersesamoidean ligament
4. Marked fraying of fibers and hemorrhage of the deep digital flexor tendon
5. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
6. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
7. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
8. Severe, deep, biaxial, erosions of the dorsal and palmar aspect of the proximal articular surface of P1
9. Moderate to severe scoring of the distal articular surface of MCIII

CHRONIC CHANGES:
1. Mild to moderate dorsal metacarpal disease with new bone formation resulting in convex appearance of the dorsal cortex, periosteum congestion, thickening
2. Mild to moderate exostosis ('blind splint') of the MCII accompanied by expansion of the palmar aspect of MCIII

LEFT FORELIMB

CHRONIC CHANGES
1. Severe dorsal metacarpal disease with woven bone formation, multiple sagittal stress fractures affecting expanded dorsal cortex, congestion and thickening of the periosteum

Other findings:
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

03/19/19: Case was re-opened due to minor corrections (typographical errors). Further testing is concluded.

02/21/19: The most important findings in the right forelimb are biaxial fractures of the proximal sesamoid bones and suspensory ligament failure. The latter injuries resulted in loss of support of the fetlock joint in the right forelimb. The aforementioned fractures may be related to the focal region of subtle discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the medial proximal sesamoid bone. However, changes of similar nature could not be located in the proximal sesamoid bones in contralateral limb. Additional findings include bilateral dorsal metacarpal disease, significantly more advanced in the left, intact forelimb, where multiple stress fractures affecting the expanded dorsal cortex are present.

Further tesiting is concluded.

02/19/19 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

RF biaxial, comminuted Sesamoid fx's disarticulated-horse was working.

## Gross Observations

Necropsy of a 4 year old [redacted] Thoroughbred [redacted] [redacted]), 545 kg, with tattoo# [redacted] is commenced at 10:30 am, February 19, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in moderate to severe 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). On the left kidney, there are multifocal to coalescing, white/grey, irregular areas (app. 2 cm x 4 cm) of capsular thickening (presumably interstitial fibrosis). The stomach contains green, soft roughage and grain particles. 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 FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones
a) Closed, simple, articular, slightly oblique, displaced, apical fracture of the lateral proximal sesamoid bone with additional axial component avulsed with intersesamoidean ligament
b) Closed, articular, transverse, comminuted, displaced, basilar fracture of the medial proximal sesamoid bone with probable predisposing lesion – the distal basilar fragment is divided into two roughly equal fragments in sagittal plane.
A possible region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through a subchondral focus of very subtle brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the abaxial surface/lateral suspensory branch insertion appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.
For better visualization of described fractures, please see attached pictures and drawings.
2. Moderate, biaxial apical modeling with irregular bony outgrowth
3. Mild scoring of the articular surfaces of the proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament rupture with very short sagittal component affecting straight distal sesamoidean ligament- 'S' shaped, the tear is following the fracture lines of the proximal sesamoid bones
2. Suspensory ligament failure with complete trasnverse rupture of the lateral branch and medial extensor branch, severe hemorrhage, severe fraying of fibers of both medial and lateral branches, which progresses proximally as incomplete longitudinal split up to proximal third of the suspensory body (lateral aspect). There is also severe, focal hemorrhage visible on the cross section of the proximal third of suspensory body ('high suspensory desmitis')
3. Marked fraying and hemorrhage of fibers of the dorsal surface of the deep digital flexor tendon at the level of the fetlock
4. Moderate fraying of fibers of the lateral and medial short and cruciate ligaments
5. Moderate fraying of fibers and incomplete longitudinal rupture of the collateral ligaments of the proximal sesamoid bones
6. Severe, longitudinal, short (app. 2-3 cm), full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
7. Moderate to severe proliferative synovitis of the fetlock joint

C- MCIII
1. Mild to moderate dorsal metacarpal disease with new bone formation resulting in convex appearance of the dorsal cortex, periosteum congestion, thickening. The periosteum is strongly adhered to the cortical bone. The cross section at the level of the mid-shaft reveals the cortical bone expansion (new bone layer is app. 2-3 mm thick). The base of the new bone rim is surrounded by the multifocal, red petechiae.
2. Mild to moderate exostosis ('blind splint') of MCII at the level of the mid-shaft accompanied by expansion of the palmar aspect of MCIII- the cross section at the level of the widest part of the exostosis reveals the rim of the new bone on the palmar aspect of MCIII, which appears to fuse with the medial splint bone.
*For better visualization of changes described in points 1 and 2, please refer to attached pictures of the cross sections.
3. Moderate to severe scoring of the distal articular surface of MCIII
4. Moderate, focal, full thickness cartilage loss along the dorsolateral edge of the articular surface of the medial condyle of distal MCIII
5. Moderate, focal, full thickness, irregularly shaped cartilage loss on the dorsal aspect of the mid-sagittal ridge of the distal articular surface of MCIII
6. Severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
7. Severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

D- P1
1. Moderate to severe scoring lines of the proximal articular surface
2. Severe, biaxial, deep bony erosion of the dorsal and palmar aspect of the proximal articular surface of P1

LEFT FRONT

A- MCIII
1. Severe dorsal metacarpal disease with woven bone formation, multiple sagittal stress fractures affecting expanded dorsal cortex, congestion and thickening of the periosteum- the cross section at the level of mid diaphysis revealed app. 3 mm thick rim of the new, consolidated bone. Its base is surrounded by multifocal, dark red petechiae. The expanded cortex has multiple, short, sagittal stress fractures, which are also surrounded by red petechiae. The outter layer of the dorsal cortex is presumably a woven bone (app. 0.5-1 mm thick, pink, relatively soft), which formed due to presence of described sagittal stress fractures.
2. Mild transverse ridge arthrosis with cartilage pitting adjacent to the parasagittal grooves
3. Mild to moderate expansion of the palmar aspect of the MCIII- the cross section at the level of the mid-shaft revealed the presence of the new, consolidated bone formation.

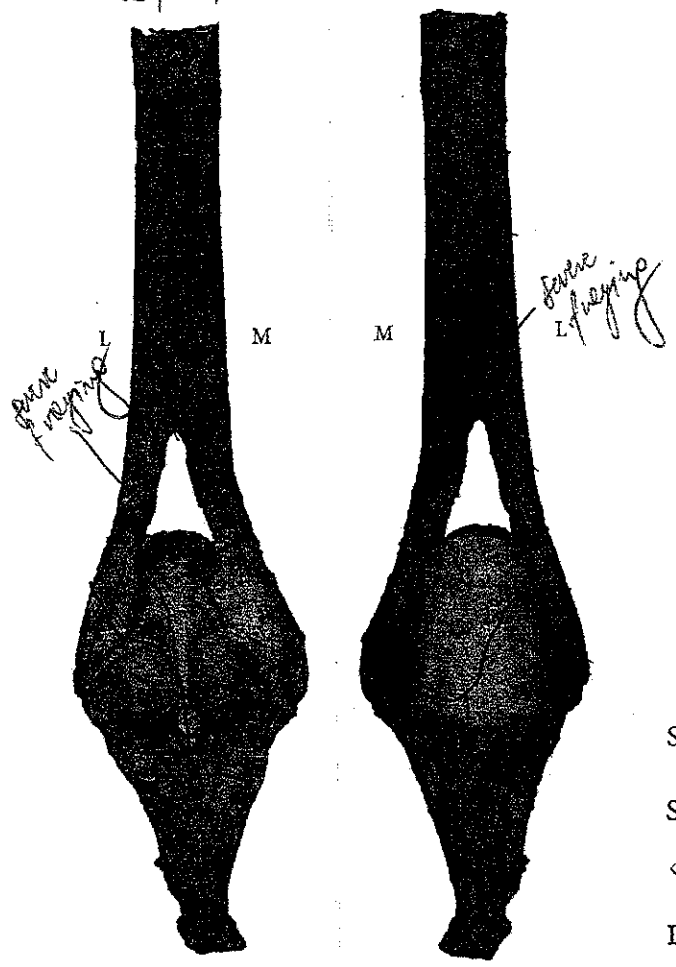
B- P1
1. Mild lipping of the dorsal aspect of the proximal articular surface of P1
2. Moderate, focal cartilage ulceration along the dorsomedial margin (app. 2 cm long) of the proximal articular surface of P1.

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

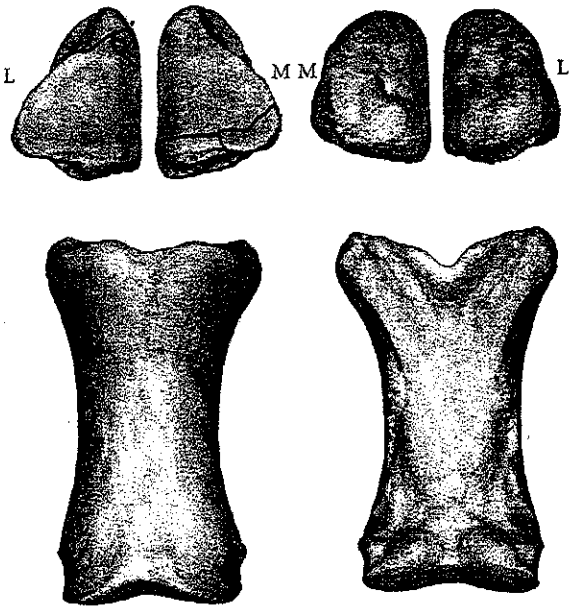
Accession # [redacted]
CC: MAS
Date: 02/13/19

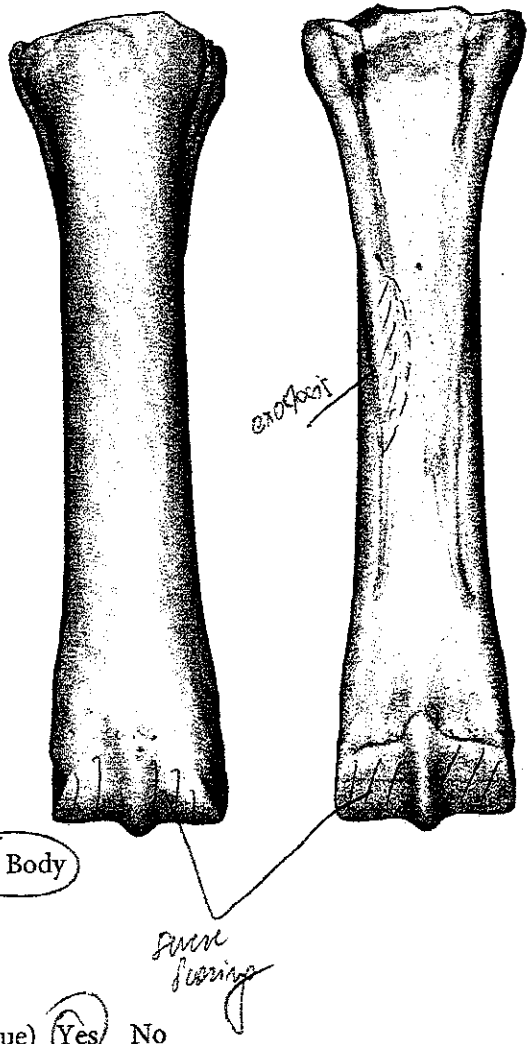
Right Fetlock

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)

Intersesamoidean ligament: (Yes) No

(Longitudinal) (Transverse)

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

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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www.cahfs.ucdavis.edu

**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/14/2019 8:31:20AM

**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:** 02/23/2019 **Date Received:** 02/23/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Birch, Sarah | 626-783-1237 | Po Box 661956 | Arcadia | CA | 91066 |
| Trainer | BAROCIO, LIBRADO | 310-467-6333 | Po Box 4763 | Culver City | CA | 90231 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | | Death Related to: | Training |
| Age: | 4.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | Past Wire |
| Taxonomy: | Thoroughbred Horse | Insured? | |

Medications: Rompun (Xylazine);

## Laboratory Findings/Diagnosis

A 4 year old [redacted] Thoroughbred [redacted] ([redacted]) submitted with history of right front open, biaxial proximal sesamoid bone fracture and disarticulated metacarpophalangeal joint

Catastrophic breakdown of right front fetlock with

RIGHT FORELIMB

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones
- Open, biaxial, simple, articular, transverse, displaced, mid-body fracture of the lateral and medial proximal sesamoid bones
2. Suspensory ligament failure: complete, transverse rupture of the lateral branch and medial branch with severe hemorrhage and moderate fraying of fibers of lateral branch
3. Complete luxation of the fetlock joint- MCIII bone completely perforated the skin, which resulted in complete exposure of

distal third of the cannon bone
4. Open, simple, non-articular, transverse, displaced fracture of the MCII
5. Severe, complete, transverse rupture of medial and lateral collateral ligaments of the fetlock
6. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
7. Severe fraying of fibers, hemorrhage and incomplete transverse rupture of the deep digital flexor tendons
8. Moderate fraying of fibers and hemorrhage of the superficial digital flexor tendon
9. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
10. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
11. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
12. Severe, deep, biaxial, erosions of the dorsal and palmar aspect of the proximal articular surface of P1
13. Severe, deep erosion of the mid-sagittal ridge of the distal articular surface of MCIII
14. Severe, longitudinal, full thickness cartilage loss of the abaxial margin of the medial condyle of the distal articular surface of MCIII

CHRONIC CHANGES:
1. Mild exostosis ('blind splint') of the medial MCII accompanied by expansion of the palmar aspect of MCIII

LEFT FORELIMB

CHRONIC CHANGES
1. Chip fracture of the abaxial margin (insertion of the lateral branch of suspensory ligament) of the medial proximal sesamoid bone
2. Mild to moderate exostosis ('blind splint') of the medial MCII accompanied by expansion of the palmar aspect of MCIII

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)

## Case Summary

03/06/19: The most important findings in the right forelimb are biaxial fractures of the proximal sesamoid bones and suspensory ligament failure. The latter injuries resulted in loss of support of the fetlock joint in the right forelimb. The aforementioned fractures may be related to the stress fractures surrounded by sclerotic trabecular bone visible on opposing surfaces of the fractured proximal sesamoid bones. Most likely, they were caused by the 'pulling' force created by suspensory branches (consequence of fetlock overextension). Interestingly, the lesions of similar nature were identified in the medial proximal sesamoid bone of the intact forelimb.

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 biaxial proximal sesamoid fractures, disarticulated metacarpophalangeal joint.

## Gross Observations

Necropsy of a 4 year old, [redacted] Thoroughbred [redacted] ([redacted]), 540 kg, with a [redacted], microchip [redacted] is commenced at 1:00 pm, 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). On the left kidney, there are multifocal to coalescing, white/grey, irregular areas (app. 1 cm x 2 cm) of capsular thickening (presumably interstitial fibrosis). 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 FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones
- Open, biaxial, simple, articular, transverse, displaced, mid-body fracture of the lateral and medial proximal sesamoid bones
The subchondral bone of opposing surfaces of both proximal sesamoid bones is highly compacted (sclerotic). The abaxial margins along the suspensory branches insertion are irregular. On the proximal component of medial proximal sesamoid bone and distal component of lateral proximal sesamoid bone, there are short (app. 0.3 cm long) stress fractures, which originate from the level of suspensory branch insertion. Both are surrounded by highly compacted trabecular bone.
For better visualization of described fractures, please see attached pictures and drawings.
2. Moderate scoring of the articular surfaces of the proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament rupture with sagittal component affecting straight distal sesamoidean ligament- 'T' shaped, the tear is following the fracture lines of the proximal sesamoid bones
2. Suspensory ligament failure with complete, transverse rupture of the lateral branch and medial branches with severe hemorrhage and moderate fraying of fibers of the palmar surface of lateral branch. The body is markedly hemorrhagic in its lateral aspect. .
3. Severe, complete, transverse rupture of medial and lateral collateral ligaments of the fetlock
4. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
5. Severe fraying of fibers, hemorrhage and incomplete transverse rupture of the deep digital flexor tendons
6. Moderate fraying of fibers and hemorrhage of the superficial digital flexor tendon
7. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
8. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
9. Moderate to severe proliferative synovitis of the fetlock joint

C- MCII
1. Open, simple, complete, non-articular, transverse, displaced fracture of the MCII- fracture resulted in complete separation of the button of the splint bone
2. Mild exostosis ('blind splint') of the medial MCII at the level of the mid-shaft accompanied by expansion of the palmar aspect of MCII

D- MCIII
1. Severe, deep erosion of the mid-sagittal ridge of the distal articular surface of MCIII
2. Severe, longitudinal, full thickness cartilage loss of the abaxial margin of the medial condyle of the distal articular surface of MCIII
3. Severe scoring of the distal articular surface of MCIII
4. Moderate, focal, full thickness, irregularly shaped cartilage loss on the dorsal aspect of the mid-sagittal ridge of the distal articular surface of MCIII
5. Moderate to severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
6. Moderate to severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII
7. Mild exostosis ('blind splint') of the medial MCII at the level of the mid-shaft accompanied by expansion of the palmar aspect of MCII

E- P1
1. Severe, biaxial, deep bony erosion of the dorsal and palmar aspect of the proximal articular surface of P1
2. Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1
3. Mild scoring lines of the proximal articular surface

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1. Chip fracture of the abaxial margin of the medial proximal sesamoid bone- the fragment separates from the level of suspensory branch insertion (roughly from its lower third). There is a white rim created by sclerotic subchondral bone proximally from the chip. The same white rim is present on the lateral proximal sesamoid bone, at the same location.
2. Moderate, biaxial, apical bone remodeling with irregular bony outgrowth

B- MCII
1. Mild to moderate exostosis ('blind splint') of the medial MCII at the level of the mid-shaft accompanied by expansion of the palmar aspect of MCII- the exostosis is app. 4 cm long and it is more prominent in distal half

C- MCIII
1. Mild to moderate fibrillation of the abaxial margin of the medial condyle of the distal articular surface of MCIII
2. Mild, biaxial, longitudinal fissures of the cartilage of the condylar grooves of the distal articular surface of MCIII
3. Mild to severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
4. Mild to severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

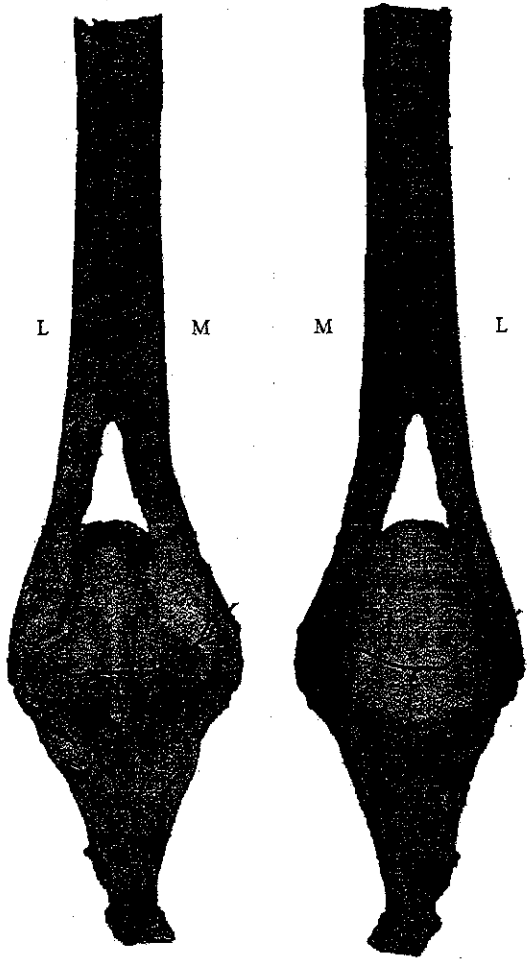
D- P1
1. Mild lipping of the dorsal aspect of the proximal articular surface of P1
2. Moderate, focal cartilage ulceration along the dorsomedial margin (app. 2 cm long) of the proximal articular surface of P1.

*Hooves
- Significant difference between shape and width of both front hooves- left front is wider and flatter (moderate underrun heels); the right front hoof is higher and narrower- for better visualization please see the attached pictures
No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

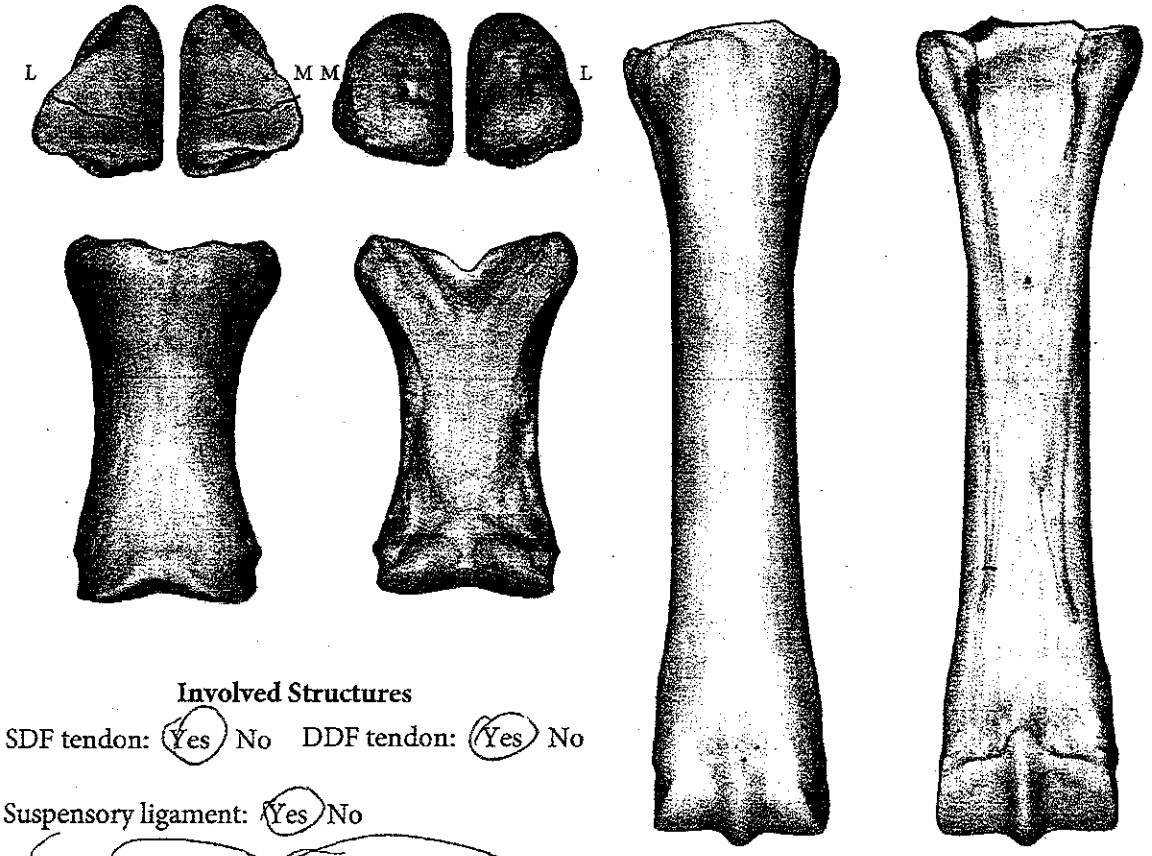
Accession # [redacted]
CC: MAS
Date: 03/05/19

Right Fetlock

Please circle affected leg
foreleg
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)




**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) (SL Lateral branch) SL Body

Intersesamoidean ligament : (Yes) No
(Longitudinal) (Transverse)

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

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? (Yes) No

Joint capsule intact? Yes (No)

Joint luxated? (Yes) No

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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 2/14/2019 9:07:15AM

**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:** 02/02/2019 **Date Received:** 02/04/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Birch, Sarah | 626-783-1237 | Po Box 661956 | Arcadia | CA | 91066 |
| Trainer | BAROCIO, LIBRADO | 310-467-6333 | Po Box 4763 | Culver City | CA | 90231 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | 3/4 Pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Dormosedan (Detomidine); Pentobarbital;

## Laboratory Findings/Diagnosis

A 3 year old [redacted] Thoroughbred [redacted] ([redacted]) submitted with a history of comminuted, slab fracture of third carpal bone, slab fracture of radial carpal bone, chip fracture of intermediate carpal bone

Catastrophic breakdown of the left carpus with

LEFT FORELIMB

ACUTE CHANGES
1) Closed, comminuted, complete, displaced, bi-articular, slab fracture of the radial carpal bone
2) Closed, comminuted, complete, displaced, bi-articular, slightly oblique, slab fracture of the ulnar carpal bone
3) Closed, comminuted, complete, displaced, bi-articular, slab fracture of the third carpal bone
4) Multiple, very small, variably shaped chip fractures of the axial margin of the carpal intermediate bone
5) Chip fractures of the axial and partially dorsal aspects of the fourth carpal bone

6) Severe scoring of the distal articular surface of the radius
7) Severe scoring and extensive cartilage loss of the articular surface of the carpal intermediate bone
8) Severe, complete rupture of the palmar intercarpal ligaments

CHRONIC CHANGES
1) Severe, focal, dark (violet/grey) discoloration of the cartilage and underlying subchondral bone of the axial aspect of the dorsal margin of the carpal intermediate bone
2) Moderate, dark (blue/violet), focal, subchondral bone discoloration visible through the cartilage of the cranial margin of the intermediate facet
3) Moderate thickening and focal hemorrhage of the origin of the suspensory ligament (high suspensory desmitis)
4) Severely thickened and hyperemic synovium of the carpal joints (proliferative synovitis)

RIGHT FORELIMB

CHRONIC CHANGES
1) Moderate, focal, rounded, full thickness cartilage loss in the middle of the cranial aspect of the intermediate facet of the distal articular surface of radius
2) Mild to moderate, focal cartilage pitting with mild, focal, blue discoloration of the underlying subchondral bone of the cranial margin and abaxial aspect of the radial facet of the distal radius
3) Severe osteophytosis of the dorsal margins of the carpal, intermediate and ulnar bones accompanied by mild to moderate cartilage ulceration
4) Moderate, focal, extensive, blue subchondral bone discoloration located roughly in the middle of the axial aspect of the radial carpal bone- the location is analogous to the main fracture line affecting carpal bone in contralateral limb
5) Moderate, two foci of blue subchondral bone discoloration of the axial and abaxial aspect along the dorsal margin of the third carpal bone
6) Moderately thickened and mildly hyperemic synovium of the carpal joints (proliferative synovitis)

Other findings:
- Mild, multifocal gastric hyperkeratosis with mild, multifocal, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

02/08/19 The most important findings associated with the left carpus are fractures of the third, fourth, radial, intermediate and ulnar carpal bones, which together with rupture of palmar intercarpal ligaments caused acute instability of the left carpus and led to catastrophic breakdown. Probably due to significant comminution of the fractured bones, I could not locate any pre-existing lesions. However, the extensive sclerosis of subchondral bone was present, which is highly suggestive evidence of ongoing chronic stress remodeling. Furthermore, the location of subchondral bone bruising in right third and radial carpal bones was analogous to the location of the fracture affecting the same bones in the contralateral limb.
Additional findings include:
• severe degenerative joint disease (DJD) in the left radiocarpal joint, middle carpal joint and carpometacarpal joint
• moderate DJD in the right radiocarpal joint, middle carpal joint with subchondral bone bruising located analogously to the fracture sites in the left carpus
• mild to moderate DJD in the left and right fetlock joints

02/04/19 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

Left Foreleg: Comminuted, "slab" fracture of third carpal bone "slab" fracture of radial carpal bone; "chip" fracture of intermediate carpal bone.

## Gross Observations

Necropsy of a 3 year old, [redacted] Thoroughbred [redacted] ([redacted]), with a [redacted] tattoo# [redacted] is commenced at 11:00 am, February 4, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of

adipose tissue, and in moderate post-mortem decomposition. The trachea contains abundant 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 along the margo plicatus is mildly hyperkeratotic with multifocal (app. 0.2-0.4 cm in diameter), very shallow ulcers. 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 chestnut. Following changes were noted:

LEFT FORELIMB

A- RADIUS
1) Severe scoring of the distal articular surface of the radius, in particular affecting radial facet, where are two extensive foci of full thickness cartilage loss- along the abaxial margin (app. 3 cm long) and on the caudal aspect of the latter facet.
2) Moderate lipping of the dorsal margin of the distal articular surface of radius
3) Moderate, dark (blue/violet), focal, subchondral bone discoloration visible through the cartilage of the cranial margin of the intermediate facet

B- CARPUS

a) Proximal articular surface of the proximal carpal row
1) Closed, comminuted, complete, displaced, bi-articular, slab fracture of the radial carpal bone- radial carpal bone can be divided into 3, roughly equal parts in frontal plane. Two dorsal and palmar, non-comminuted fragments and highly comminuted part in between the latter two. The middle component consists of multiple, small, variably shaped, scattered fragments. The subchondral bone and partially trabecular bone (axial aspect in proximal third) of the dorsal piece is highly compacted (sclerotic).
2) Severe, focal, dark (violet/grey) discoloration of the cartilage and underlying subchondral bone of the axial aspect of the dorsal margin of the carpal intermediate bone, surrounding the osteophyte. The cartilage adjacent to the osteophyte is moderately ulcerated.
3) Mild scoring of the proximal articular surface of the carpal bones constituting the proximal row

b) Distal articular surface of the proximal carpal row
1) Closed, comminuted, complete, displaced, bi-articular, slab fracture of the radial carpal bone- within this articular surface the radial carpal bone is divided into two major segments, also in frontal plane. The palmar fragment in the dorsal part is comminuted, it is comprised of two wedge shaped fragments and multiple, very small, variably shaped fragments. There is also extensive cartilage loss along the main fracture line and along the dorsal margin on the dorsal fracture component.
2) Multiple, very small, variably shaped chip fractures, which broke off the axial marigin of the carpal intermediate bone
3) Severe scoring and extensive cartilage loss (about 50% of the cartilage remained) of the articular surface of the carpal intermediate bone
4) Closed, comminuted, complete, displaced, bi-articular, slightly oblique, slab fracture of the ulnar carpal bone- the fracture is not visible on the proximal articular surface, because it is partially covered by accessory carpal bone. The ulnar carpal bone is also divided into two components, among which the palmar one is smaller and comminuted (small, variably shaped fragments). The subchondral bone of the distal articular surface is highly sclerotic.

c) Proximal articular surface of the distal carpal row
1) Closed, comminuted, complete, displaced, bi-articular, slab fracture of the third carpal bone- the main fracture line courses through the intermediate and radial facets in dorsal plane and divides the third carpal bone into two major, dorsal and palmar components. The dorsal component is comminuted in its abaxial part, within the intermediate facet. There is extensive, full thickness cartilage loss along the major fracture line affecting the palmar component. The opposing fracture surfaces reveal highly compacted subchondral bone, which is more evident within the proximal articular surface.
2) Chip fractures of the axial and partially dorsal aspects of the fourth carpal bone

d) Distal articular surface of the distal carpal row
1) Moderate scoring and degeneration of the cartilage (thinning) of the proximal articular surface of the carpal bones constituting the distal row

C- MCIII
1) Moderate scoring of the proximal articular surface of MCIII
2) Mild to moderate scoring of the distal articular surface of MCIII
3) Mild to moderate transverse ridge arthrosis with cartilage fibrillation and mild pink discoloration
4) Moderate hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
5) Moderate hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MCIII

D- SOFT TISSUE
1) Moderate thickening and focal hemorrhage of the origin of the suspensory ligament (high suspensory desmitis)
2) Severely thickened and hyperemic synovium of the carpal joints (proliferative synovitis)
3) Severe, complete rupture of the palmar intercarpal ligaments
4) Moderately thickened and mildly hyperemic synovium of the fetlock joint (proliferative synovitis)

E- PROXIMAL SESAMOID BONES
1) Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones
2) Mild scoring lines of the articular surfaces of the proximal sesamoid bones

F- P1
1) Moderate lipping of the dorsal and palmar margins of the proximal articular surface of P1
2) Moderate, biaxial erosion along the dorsal margin of proximal articular surface of P1

RIGHT FRONTLIMB

A- RADIUS
1) Moderate scoring of the distal articular surface of radius
2) Mild to moderate lipping of the cranial margin of the distal articular surface of radius
3) Moderate, focal, rounded, full thickness cartilage loss in the middle of the cranial aspect of the intermediate facet of the distal articular surface of radius
4) Mild to moderate, focal cartilage pitting with mild, focal, blue discoloration of the underlying subchondral bone of the cranial margin and abaxial aspect of the radial facet of the distal radius

B- CARPUS

a) Proximal articular surface of the proximal carpal row
1) Severe osteophytosis present on the dorsal margins of the carpal, intermediate and ulnar bones accompanied by mild to moderate cartilage ulceration (in particular on the radial carpal bone)
2) Moderate, focal, extensive, blue subchondral bone discoloration located roughly in the middle of the axial aspect of the radial carpal bone- the location is analogous to the main fracture line affecting carpal bone in contralateral limb

b) Distal articular surface of the proximal carpal row
1) Mild, shallow foci of the cartilage ulceration located on the dorsal margins of the intermediate and radial bones accompanied by grey cartilage discoloration

c) Proximal articular surface of the distal carpal row
1) Moderate, two foci of blue subchondral bone discoloration of the axial and abaxial aspect along the dorsal margin of the third carpal bone
2) Moderate lipping of the dorsal margin of the third and fourth carpal bones

C- MCIII
1) Mild scoring of the distal articular surface of MCIII
2) Mild transverse ridge arthrosis with cartilage fibrillation
3) Mild hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
4) Mild hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MCIII

D- PROXIMAL SESAMOID BONES
1) Mild, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones
2) Mild scoring lines of the articular surfaces of the proximal sesamoid bones

E- SOFT TISSUES
1) Moderately thickened and mildly hyperemic synovium of the carpal joints (proliferative synovitis)
2) Mildly thickened and mildly hyperemic synovium of the carpal joints (proliferative synovitis)

F- P1
1) Mild lipping of the dorsal and palmar margins of the proximal articular surface of P1
2) Mild, biaxial erosion along the dorsal margin of proximal articular surface of P1

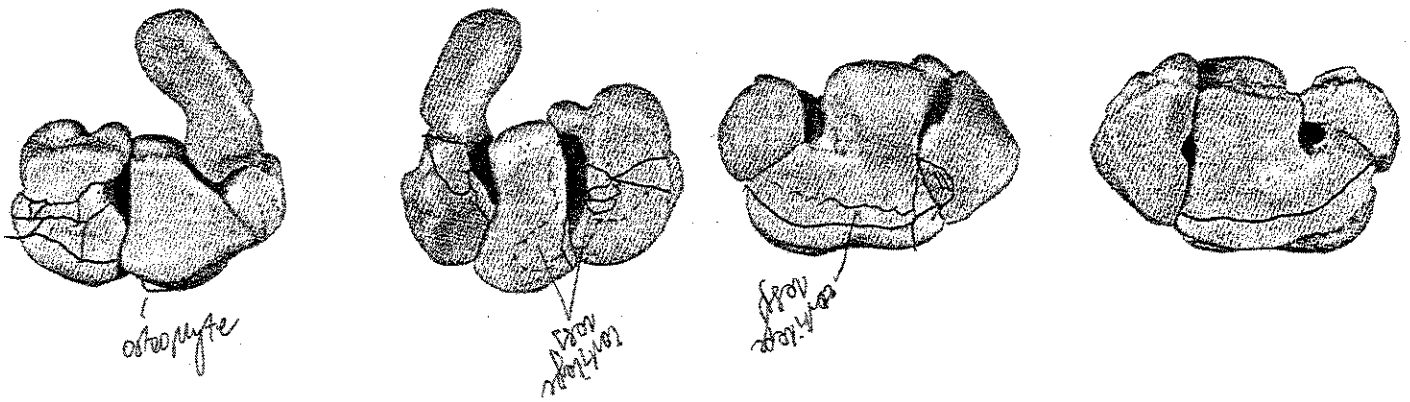
No gross lesions/ abnormalities were identified in other bones of both distal front limbs examined from the level of the chestnut.

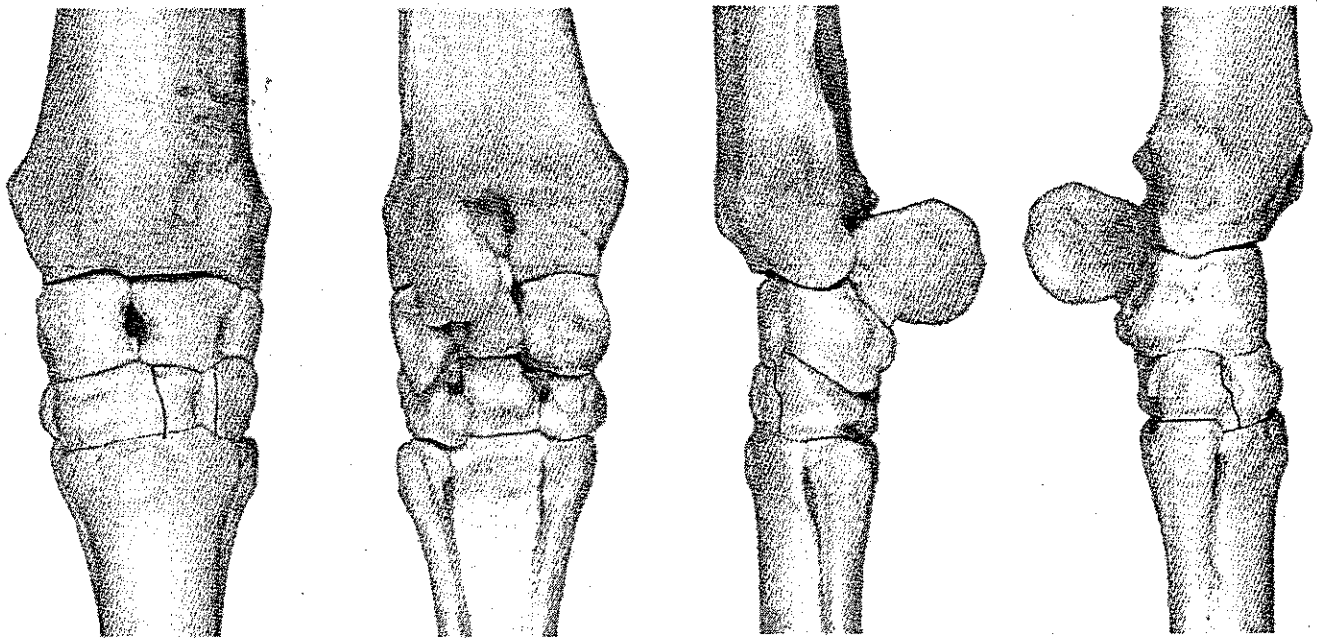
Acc [redacted]
Date 02/06/18
CC MAS

Carpus - Left

**Nature:**

- [ ] Open
- [ ] Simple
- [x] Complete
- [x] Displaced
- [x] Articular
- [x] Slab
- [x] Closed
- [x] Comminuted
- [ ] Incomplete
- [ ] Non-displaced
- [ ] Non-articular



**Pre-existing callus:**

- [ ] Yes
- [ ] Unable to evaluate
- [x] No

**Legend:**

Callus

Incomplete Fx

M Missing fragments

UCDAVIS
VETERINARY MEDICINE
105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
www.cahfs.ucdavis.edu

**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 2/6/2019 1:19:11PM

**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:** 01/21/2019 **Date Received:** 01/22/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | FARMER, WILL | 626-574-6355 | 285 W Huntington | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | VALKO, KAREN | 951-317-7935 | 334 W Arrow Hwy Unit B | San Dimas | CA | 91773 |
| Trainer | PROCTOR, TOM | 502-744-9016 | 466 Jurich Court Ave | Simpsonville | KY | 40067 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 5.00 Years | Track Surface: | Turf |
| Gender: | Female | Location on Track: | 5/8th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | Y |

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

## Laboratory Findings/Diagnosis

A 5 year old [redacted] Thoroughbred [redacted] ([redacted]) submitted with a history of left hind mid third metatarsal bone comminuted fracture

Catastrophic breakdown of the left MTIII with:

LEFT HIND LIMB
Acute changes
- Open, comminuted with multiple fragments missing, complete, displaced, articular, diaphyseal, oblique and parasagittal, medial condylar fracture of MTIII with incomplete sagittal stress fractures in the dorsal cortex of the mid-shaft
- Open, comminuted, complete, non-articular, transverse fracture of the MTII and MTIV
- Severe fraying and diffuse hemorrhage of body of the suspensory ligament
- Severe fraying of the common digital extensor tendon

Chronic changes
- Severe dorsal metatarsal disease with diffuse, red petechiae in cortical bone, moderate thickening of the mid-dorsal cortex with multiple sagittal stress fractures, mild thickening of the remaining periosteum
- Moderate lipping of the dorsal and plantar margin of the proximal articular surface of P1
- Moderate, biaxial cartilage fibrillation of the dorsal margin of the proximal articular surface of P1

RIGHT HIND LIMB

Chronic changes
- Moderate dorsal metatarsal disease with mild periosteum thickening and multifocal, red petechiae in the focally off-colored/pale dorsal cortical bone
- Mild to moderate, focal, pink subchondral bone discoloration visible through the cartilage of the medial plantar eminence of the proximal articular surface of P1
- Mild lipping of the dorsal and plantar margin of the proximal articular surface of P1

Other findings
- Mild, multifocal gastric hyperkeratosis with mild, multifocal, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

01/29/19 The most important findings include open, complete, highly comminuted with numerous fragments missing, fracture of the diaphysis and medial condyle of the left third metatarsal/cannon bone. The fracture resulted in the loss of support of the left hindlimb. The injury most likely was associated with focal porosity surrounded by highly sclerotic bone in medial condyle and severe dorsal cortex stress remodeling (severe dorsal metatarsal disease) that combined, likely predisposed to complete fracture of the cannon bone.

01/22/19 No significant findings were identified in visceral organs. At the time of necropsy, both hind 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

Horse was near the 9/16 pole (less than 1/2 mile into race) when it suddenly went wrong. LH mid MTIII compound comminuted fx.

## Gross Observations

Necropsy of a 5 year old, [redacted] Thoroughbred [redacted] ([redacted]'), 494 kg, with a [redacted], tattoo [redacted] is commenced at 8:0 pm, January 22, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in moderate post-mortem decomposition. The trachea contains abundant 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 along the margo plicatus is mildly hyperkeratotic with multifocal (app. 0,5 cm - diameter), shallow ulcers. The intestinal tract is unremarkable, and the small colon contains formed feces.
Both hind limbs are removed at the level of the chestnut for further examination.

## CHRB Musculoskeletal

Both hind limbs were examined distally to the tibio-tarsal joints. The following changes were seen:

LEFT HIND LIMB

MTIII
- Open, comminuted with multiple fragments missing, complete, displaced, non-articular, diaphyseal and parasagittal, articular, medial condylar fracture of MTIII with incomplete sagittal stress fractures in the dorsal cortex of the mid-shaft

The cannon bone is divided into two major, distal and proximal components. Multiple key fragments are missing- in the specimen

there are no fragments of dorsomedial diaphysis, lateral part of the distal third of the shaft and extensive plantar fragment/fragments of the shaft together with distal parts of the fractured splint bones. The cortical bone of the proximal segment is affected by severe metatarsal disease with multifocal red petechiae (especially along the main fracture line), moderate thickening of the dorsal cortex with multiple sagittal incomplete stress fractures and cortical bone discoloration (pale, off-colored). The dorsal periosteal surface of the remaining fragments appears to be mildly roughened/irregular and also slightly thickened. In the cortical bone surrounding the proximal aspect of the diaphyseal fracture the petechiae have slightly different appearance. They are dark (dark blue/violet) and its distribution is sparse in comparison to the distal part of this fracture component. There are also two incomplete fracture line progressing proximally for app. 4 cm from the very proximal edge of the main, diaphyseal fracture line.
The distal segment is split into two major pieces by a medial, condylar, parasagittal, articular fracture. The lateral fragment is divided presumably into half in transverse plane (the proximal piece is missing). The multifocal, red petechiae and pale bone discoloration are also present along the fracture line of the distal component.

- Medial condylar, parasagittal, articular stress fracture- the opposing surfaces of the fracture reveal focal, red spot of increased bone porosity surrounded by highly compacted/sclerotic bone

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

MTII
- Complete, transverse, simple, displaced fracture at the level of the mid-shaft, from the distal component there is only a small part of the splint button embedded in the hemorrhagic soft tissue

MTIV
- Complete, transverse, simple, displaced fracture at the level of the mid-shaft, the distal part of the bone is completely missing

SOFT TISSUES
- Severe fraying and diffuse hemorrhage with multiple small bony fragments embedded in the dorsal surface of the body of the suspensory ligament at the level of the fracture
- Moderate thickening with dark red discoloration (visible on the cross-section) of the medial and lateral suspensory branches
- Severe fraying of the common digital extensor tendon extending from the level of proximal third of MTIII to its distal third

PROXIMAL SESAMOID BONES
- Moderate scoring of the articular surfaces of the proximal sesamoid bones
- Moderate synovial discoloration underneath the bases of the proximal sesamoid bones

P1
- Moderate lipping of the dorsal and plantar margin with pink discoloration of the proximal articular surface of P1
- Moderate, biaxial, focal cartilage fibrillation of the dorsal margin of the proximal articular surface of P1 (dorsomedial margin is more affected)
- Mild to moderate scoring of the proximal articular surface of P1

RIGHT HIND LIMB

MTIII
- Moderate dorsal metatarsal disease with mild periosteum thickening and multifocal, red petechiae in the focally off-colored/pale dorsal cortical bone

PROXIMAL SESAMOID BONES
- Mild, biaxial apical modeling with subtle, irregular bony outgrowth

P1
- Mild to moderate, focal, pink subchondral bone discoloration visible through the cartilage of the medial plantar eminence of the proximal articular surface of P1
- Mild lipping of the dorsal and plantar margin of the proximal articular surface of P1
- Mild, biaxial, focal cartilage fibrillation of the dorsal margin of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other bones of both distal hind limbs examined from the level of the midshaft of the tibia to the hoof.

Acc # [redacted]
Date 09/28/2018
CC MAS

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

**Location:**
- [ ] Proximal Epiphyseal
- [ ] Proximal Metaphyseal
- [ ] Proximal Physeal
- [x] Diaphyseal
- [x] Condylar
  - Medial ___ cm
  - Lateral 6 cm
- [ ] Distal Epiphyseal
- [ ] Distal Metaphyseal
- [ ] Distal Physeal

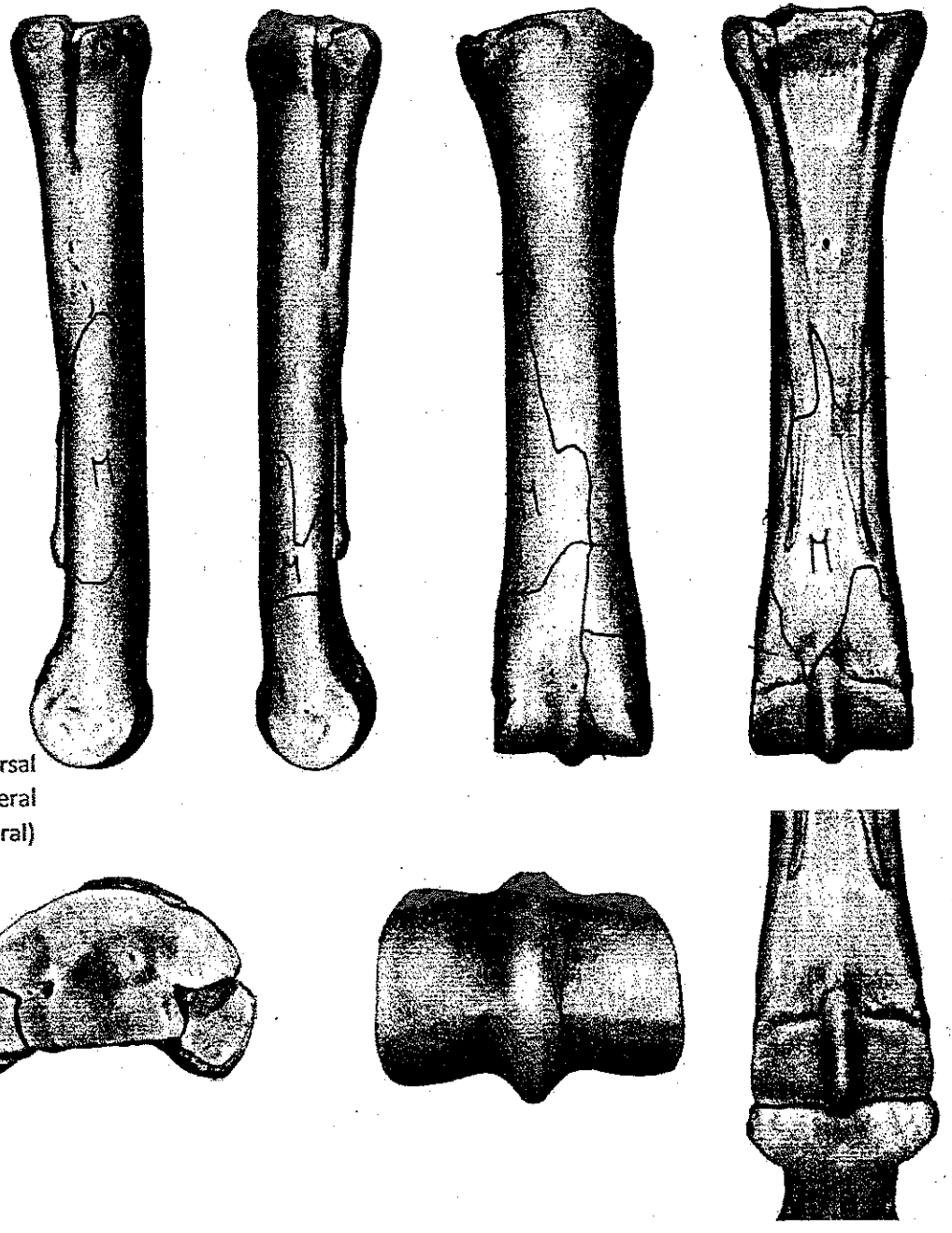
**Configuration:**
- [x] Axial (longitudinal)
- [ ] Transverse
- [ ] Segmental
- [ ] Butterfly
- [x] Oblique

**Direction:**
- [ ] Proximodorsal-Distopalmar
- [ ] Proximolateral-Distomedial
- [x] Sagittal
- [ ] Proximopalmar-Distodorsal
- [ ] Proximomedial-Distolateral
- [ ] Dorsal plane (mediolateral)

**Pre-existing callus:**
- [x] Yes
- [x] Unable to evaluate
- [ ] No

**Legend:**
- Callus
- Incomplete Fx
- M Missing fragments

Metatarsal Bones - Left




[redacted]

UCDAVIS
VETERINARY MEDICINE
105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
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**CAHFS Accession #:** [redacted]
**Addendum Version 1**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 5/21/2019 11:29:01AM

**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:** 03/05/2019 **Date Received:** 03/05/2019

**Comments:** CHRB -

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | Baker, Rita L | 916-263-6038 | 1010 Hurley Way, Suite #300 | Sacramento | CA | 95825 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | BLEA, JEFF A | 626-886-1688 | 282 W. Sierra Madre Blvd | Sierra Madre | CA | 91024 |
| Trainer | MCANALLY, RONALD | 626-441-2334 | 740 S Orange Grove Blvd #7 | Pasadena | CA | 91105 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 4.00 Years | Track Surface: | Dirt |
| Gender: | Female | Location on Track: | 3/8 pole |
| Taxonomy: | Thoroughbred Horse | Insured? | |

Medications: Dormosedan (Detomidine); Pentobarbital; Torbugesic (Butorphanol);

## Laboratory Findings/Diagnosis

A 4 year old, [redacted] Thoroughbred [redacted] ([redacted]') submitted with a history of right front biaxial sesamoid compound fractures with rupture of suspensory apparatus

Catastrophic breakdown of ~~right~~ Left front fetlock with:

This case was submitted as a right front fetlock, but the injury was to the left front fetlock

LEFT FORELIMB

ACUTE CHANGES
1. Proximal sesamoid bone fractures
a) Closed, comminuted, articular, transverse, displaced, basilar fracture of the lateral proximal sesamoid bone with oblique fracture line coursing through the proximal fracture component
b) Closed, simple, articular, transverse, displaced, basilar fracture of the medial proximal sesamoid bone with possible

predisposing lesion identified in abaxial aspect of the distal fracture fragment
2. Severe, full-thickness cartilage loss along the fracture lines of the proximal sesamoid bones
3. Moderate scoring of articular surfaces of the proximal sesamoid bones
4. Suspensory ligament failure with complete, transverse rupture of the medial branch, mild to moderate fraying of the palmar surface of the medial branch
5. Moderate to severe fraying of the lateral collateral ligament of the fetlock
6. Moderate fraying, hemorrhage and incomplete transverse rupture of the palmar surface of the deep and superficial digital flexor tendons
7. Severe, full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
8. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
9. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
10. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
11. Severe, extensive, full thickness cartilage loss of the medial and lateral condyles of the distal articular surface of MCIII
12. Moderate to severe scoring of the distal articular surface of MCIII

CHRONIC CHANGES
1. Moderate to severe, biaxial palmar ostechondral disease with blue subchondral bone discoloration (bruising) visible through the flattened and degenerated cartilage overlying condyles of the distal MCIII
2. Moderate transverse ridge arthrosis with cartilage fibrillation

RIGHT FORELIMB

CHRONIC CHANGES
Moderate degenerative joint disease (DJD)
1. Moderate to severe, palmar osteochondral disease with blue subchondral bone discoloration (bruising) visible through the flattened and degenerated cartilage overlying medial condyle of the distal MCIII
2. Moderate to severe transverse ridge arthrosis with cartilage ulceration surrounded by red discolored fibrous tissue
3. Moderate, multifocal, red discoloration of the cartilage of the abaxial aspects on the proximal sesamoid bones
4. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
5. Moderate scoring of articular surfaces of the proximal sesamoid bones

Other fidnings:
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

05/21/19: The information on the submission form is incorrect. Horse sustained injury to the left front fetlock, not the right front.

03/13/19: The most important findings in the left forelimb are fractures of the proximal sesamoid bones and complete rupture of the medial branch of suspensory ligament. The latter injuries resulted in loss of support of the fetlock joint in the left forelimb. The aforementioned fractures may be related to the subtle focal region of discoloration and bone porosity/osteopenic focus noted in the distal fracture surface in the medial proximal sesamoid bone. However, changes of similar nature could not be confidently identified in the proximal sesamoid bones in contralateral limb.

03/05/19 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

Updated: Right Front fetlock compound sesamoid fractures with rupture of the suspensory apparatus. Horse was working 5/8.

## Gross Observations

Necropsy of a 4 year old, [redacted] Thoroughbred [redacted] 440 kg, with [redacted], [redacted] commenced at 2:30 pm, March 5, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in mild post-mortem decomposition state. 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. 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:

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bone
a) Closed, comminuted, articular, transverse, displaced, basilar fracture of the lateral proximal sesamoid bone – The distal fracture segment is divided into three fragments- small, triangular piece, based roughly in the middle and two fragments adjacent to it. The proximal component is divided by oblique fracture line coursing through the mid-body into two components that are firmly fixed to the intersesamoidean ligament.

b) Closed, simple, articular, transverse, displaced, basilar fracture of the medial proximal sesamoid bone with possible predisposing lesion identified in abaxial aspect of the distal fracture fragment. A possible region of increased porosity is present at the abaxial aspect of the distal fracture surface of the medial proximal sesamoid bone. The fracture line propagates through a subchondral focus of red, subtle discoloration surrounded by highly compacted trabecular bone (sclerosis), which is adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral and trabecular bone is highly compacted (sclerotic) on both opposing surfaces of the fracture.

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

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament rupture with short sagittal component affecting straight distal sesamoidean ligament- 'T' shaped; the tear follows the main fracture line of the proximal sesamoid bones
2. Suspensory ligament failure with complete, transverse rupture of the medial branch, mild to moderate fraying of the palmar surface of the medial branch
3. Moderate to severe proliferative synovitis of the fetlock joint
4. Moderate to severe fraying of the lateral collateral ligament of the fetlock
5. Moderate fraying, hemorrhage and incomplete transverse rupture of the palmar surface of the deep and superficial digital flexor tendons- the incomplete tears affect both medial and lateral edge, are very short app. 1-1.5 cm
6. Severe, full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
7. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
8. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
9. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones

C- MCIII
1. Moderate to severe, biaxial palmar ostechondral disease with blue subchondral bone discoloration (bruising) visible through the flattened and degenerated cartilage overlying condyles of the distal MCIII. The bruising of the medial condyle is more distinct, ellipsoidal in shape, and app. 1.5 cm x 0.5 cm in diameter.
2. Severe, extensive, full thickness cartilage loss of the medial and lateral condyle of the distal articular surface of MCIII- dorsal to the transverse ridge the cartilage is completely degenerated. There are two foci of ulceration, one on each one condyle; the one on the medial condyle is larger, app. 2 cm x 3 cm in diameter, on the lateral condyle 1 cm x 1.3 cm in diameter
3. Moderate to severe scoring of the distal articular surface of MCIII with multiple clefts of variable depth and width
4. Severe hemorrhage accompanied by soft tissue proliferation at the palmar aspect of the supracondylar region of MCIII
5. Severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

D- P1
1. Mild scoring lines of the proximal articular surface of P1
2. Moderate to severe, biaxial cartilage erosion of the dorsal margins of the proximal articular surface of P1

RIGHT FRONT

A- PROXIMAL SESAMOID BONES
1. Moderate, multifocal, red discoloration of the cartilage on the abaxial aspects of the proximal sesamoid bones
2. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
3. Moderate scoring of articular surfaces of the proximal sesamoid bones

B- SOFT TISSUES
1. Moderate proliferative synovitis and hemarthrosis of the fetlock joint

C- MCIII
1. Moderate to severe, palmar osteochondral disease with blue subchondral bone discoloration (bruising) visible through the flattened and degenerated cartilage overlying medial condyle of the distal MCIII
2. Moderate to severe transverse ridge arthrosis with cartilage ulceration surrounded by red discolored fibrous tissue
3. Severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
4. Severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII
5. Mild to moderate scoring of the distal articular surface of MCIII

D- P1
1. Mild lipping of the dorsal aspect of the proximal articular surface of P1
2. Mild scoring of the proximal articular surface
3. Mild to moderate, biaxial cartilage erosions of the dorsal margin of the proximal surface of P1

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

## Appendix - Report Related Images

Accession [redacted]

Updated 3/10/19

STATE OF CALIFORNIA
CALIFORNIA HORSE RACING BOARD
NECROPSY SUBMISSION FORM
CHRB-72 (Rev. 06/04)

CAHFS - Davis
620 W. Health Sciences Dr.
Davis, CA 95616
Phone. (530) 752-8709
Fax. (530) 752-7170
chrbnecropsy.davis@ad3.ucdavis.edu

CAHFS - San Bernardino
105 W. Central Ave
San Bernardino. CA 92408
Phone. (909) 383-4287
Fax. (909) 884-5980
chrbnecropsy.sanb@ad3.ucdavis.edu

CAHFS – Tulare
18830 Road 112
Tulare, CA 93274
Phone. (559) 688-7543
Fax. (559) 686-4231
chrbnecropsy.tulare@ad3.ucdavis.edu

Additional necropsy examination(s) that exceed the standard necropsy or equine special necropsy required by and provided through the California Horse Racing Board (CHRB) are the responsibility of the requesting individual (SEE REVERSE SIDE).

**When a horse dies or is euthanized and the CHRB Official Veterinarian is not available;** the owner's or trainer's attending veterinarian must phone the laboratory within one hour and fax this completed Necropsy Submission Form to the laboratory. A copy of the completed Necropsy Submission Form must be given to the CHRB Official Veterinarian on the official Veterinarian's next scheduled work day.

Delay of necropsy makes some test results questionable in value. A necropsy will not be performed until the following information has been provided:

Dr. Grande
Name of CHRB Official Veterinarian
Santa Anita
Track Name
285 W. Huntington Drive
Address
Arcadia CA 91007
City State Zip Code
(626) 574-6355
Phone

[redacted]
Name of Horse
4 Thoroughbred
Age (years) Breed
female No
Sex Castrated
Tattoo ◉ Yes [redacted]
○ No. Color and markings

[redacted]
Name of Owner(s)
[redacted]
Address
[redacted]
City State Zip Code
[redacted]
Phone
Multiple Owner's Yes ○ No ○
Unknown ○

Dr. Jeff Blea
Name of Attending Veterinarian
282 W Sierra Madre Blvd
Address
Sierra Madre CA 91024
City State Zip Code
(626) 886-1688
Phone
or Dr. Jeff Blea
Signature (electronically signed or typed)

Ron McAnally
Name of Trainer Trainer License #
740 S. Orange Grove Blve #7
Address
Pasadena CA 91105
City State Zip Code
(626) 441-2334
Phone

Medications:
Santa Anita
Track where injury occurred
Dorm/Torb
3/8th Pole
Location on track where injury occurred
Turf ○ Synthetic ○ Maindirt ◉ Training-dirt ○

History: Died ○ Euthanized ◉
Pentobarbital
Agents used for Euthanasia
03/05/2019
Date of death
07:45 a.m. ◉ p.m. ○
Time of death

Horse insured: Yes ○ No ○ Unknown ○
Human Injury: Yes ○ No ◉ Unknown ○

Clinical findings & diagnosis:

Right Front fetlock compound sesamoid fractures with rupture of the suspensory apparatus. Horse was working 5/8.

The injury is related to one of the following: Running of the race ○ Training ◉ Non-exercise related ○ Other ○

Signature of CHRB Official Veterinarian

Date

Updated form? No

[redacted]

## Appendix - Report Related Images



UNIVERSITY OF CALIFORNIA, DAVIS

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CALIFORNIA ANIMAL HEALTH & FOOD SAFETY
LABORATORY SYSTEM
P.O. BOX 1770
DAVIS, CALIFORNIA 95617

PHONE: (530) 752-8700
FAX: (530) 752-6253

March 20, 2019

Rick Arthur, DVM
California Horse Racing Board
285 West Huntington Drive
Arcadia, CA 91007

RE: Sample [redacted]

Received: March 07, 2019
Date Taken: March 05, 2019
Laboratory No.: EACL-190307-3
No. of Samples: 1

INVESTIGATION: Post Mortem Analysis

One blood (serum) and aqueous humor sample collected from a horse at Santa Anita was received from CAHFS-San Bernadino.

The contents were analyzed by Liquid Chromatography - Mass Spectrometry and Gas Chromatography – Mass Spectrometry for the presence exogenous substances.

The aqueous humor sample was analyzed and hydroxy-detomidine, a metabolite of detomidine was detected. The blood sample was analyzed for NSAIDs and phenylbutazone (6.24 µg/mL) was detected. Confirmation analysis was not performed.

If you have any questions or require additional information, please don't hesitate to contact me.

The remainder of the original sample will be stored at the Maddy Lab and disposed of after 1 month.

Sincerely,

Benjamin Moeller, PhD DABT
Assistant Professor
University of California – Davis

[redacted]

Acc # [redacted]

Date 03/11/13

CC MAG

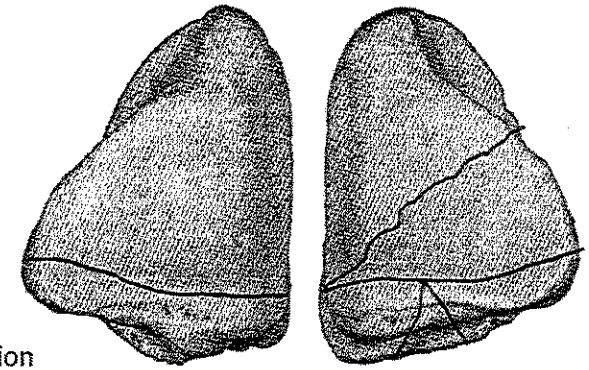
# Proximal Sesamoid Bones

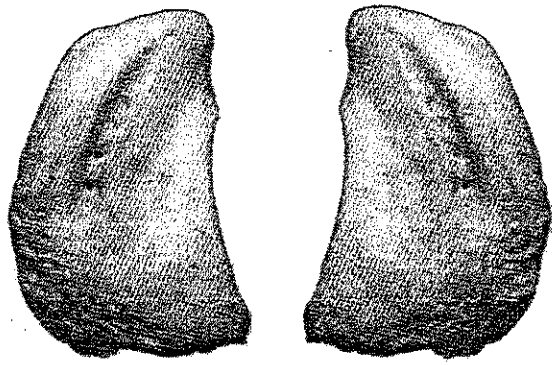
**Nature:**

- [ ] Open
- [ ] Simple
- [x] Complete
- [x] Displaced
- [x] Articular
- [x] Closed
- [x] Comminuted
- [ ] Incomplete
- [ ] Non-displaced
- [ ] Non-articular

**Location:**

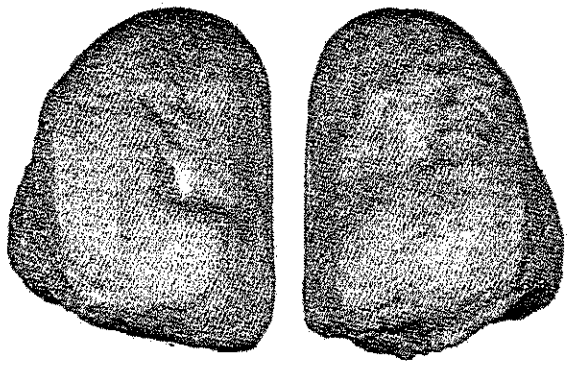
- [ ] Apical
- [x] Mid Body
- [x] Basilar
- [ ] Avulsion





**Configuration:**

- [x] Axial (longitudinal)
- [x] Transverse
- [ ] Segmental
- [ ] Butterfly
- [ ] Oblique

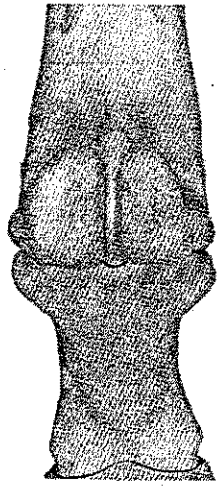


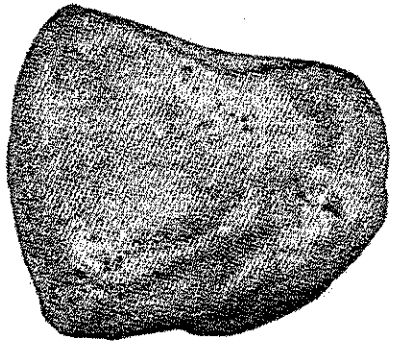
**Distribution:**

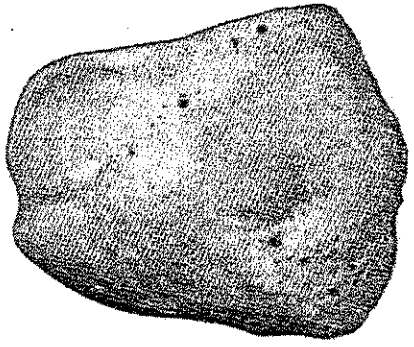
- [ ] Axial
- [ ] Abaxial

**Pre-existing ~~callus~~ lesion:**

- [x] Yes
- [ ] Unable to evaluate
- [ ] No







**Legend:**

Callus

Incomplete Fx

M Missing fragments

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105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 2/7/2019 10:39:59AM

**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:** 01/21/2019 **Date Received:** 01/22/2019

**Comments:** CHRB - [redacted]

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | FARMER, WILL | 626-574-6355 | 285 W Huntington | Arcadia | CA | 91007 |
| Bill To | CALIFORNIA HORSE RACING BOARD | 916-263-6000 | 1010 Hurley Way Suite 300 | Sacramento | CA | 95825 |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | FINLEY, JENNIFER | 626-422-6412 | 139 S Los Robles Ave 208 | Pasadena | CA | 91105 |
| Trainer | Powell, Leonard | 626-975-6908 | 631 Hammond St | West Hollywood | CA | 90069 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | 5/8th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Banamine (Flunixin); Butazolidin (Phenylbutazone); Dormosedan (Detomidine); Lasix (Furosemide); Pentobarbital; Torbugesic (Butorphanol);

## Laboratory Findings/Diagnosis

A 3 year old dark [redacted] Thoroughbred [redacted] ([redacted]) submitted with a history of left front biaxial sesamoid bone fracture during the race

Catastrophic breakdown of left front fetlock with:

LEFT FRONTLIMB

ACUTE CHANGES
1. Fracture of the medial proximal sesamoid bone
a) Closed, comminuted, articular, transverse, displaced, mid-body fracture with brown focus of discoloration/porosity (pre-existing lesion)
2. Severe scoring of the articular surfaces of the proximal sesamoid bones
3. Severe, focal, full thickness cartilage loss in the center of the articular surface of the lateral proximal sesamoid bone
4. Full thickness, transverse rupture of the palmar annular ligament

5. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
6. Marked to severe fraying of fibers and hemorrhage of the deep digital flexor tendon
7. Marked fraying of fibers and complete transverse tear of the superficial digital flexor tendon
8. Severe fraying of fibers and hemorrhage of the lateral and medial short and cruciate ligaments
9. Severe fraying of fibers of medial collateral ligament of the proximal sesamoid bones
10. Severe fraying of fibers, complete longitudinal split and hemorrhage of the straight distal sesamoidean ligament
11. Severe scoring of the distal articular surface of MCIII
12. Severe erosion of the dorsal margin of the proximal articular surface of P1
13. Moderate scoring of the proximal articular surface of P1

CHRONIC CHANGES:
1. Mild to moderate, biaxial palmar osteochondrosis with blue, focal subchondral bone discoloration visible through the flattened and degenerated cartilage of the medial and lateral condyles of the distal articular surface of MCIII

RIGHT FORELIMB

CHRONIC CHANGES
1. Mild to moderate, biaxial palmar osteochondrosis with blue, focal subchondral bone discoloration visible through the flattened and degenerated cartilage of the medial and lateral condyles of the distal articular surface of MCIII
2. Mild to moderate scoring of the distal articular surface of MCIII
3. Moderate to severe synovial hyperplasia with red discoloration underneath the bases of the proximal sesamoid bones
4. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
5. Mild scoring lines of the articular surface of the proximal sesamoid bones
6. Moderate lipping of the dorsal and palmar margin of the proximal articular surface of P1
7. Moderate scoring of the proximal articular surface of P1

Other findings
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

01/31/19: The most important finding in the left forelimb is fracture of the medial proximal sesamoid bone. The injury resulted in loss of support of the fetlock joint of the left forelimb. The reason of the aforementioned fracture may be related to the focal region of brown discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the medial proximal sesamoid bone. However, besides moderate osteoarthritis affecting the right fetlock, changes of similar nature could not be located in the medial proximal sesamoid bone in contralateral limb.

01/22/19 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

Horse was approx 1/8th mile into race and suddenly went wrong. LF biaxial sesamoid fxs.

## Gross Observations

Necropsy of a 3 year old, dark [redacted] Thoroughbred [redacted], 500 kg, with [redacted], tattoo [redacted] is commenced at 9:30 am, January 22, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in moderate post-mortem decomposition. The trachea contains abundant 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. 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 chestnut. Following changes were seen:

LEFT FRONTLIMB

A- PROXIMAL SESAMOID BONES
1. Fracture of the medial proximal sesamoid bone
a) Closed, comminuted, articular, transverse, displaced, mid-body fracture with axial component avulsed with intersesamoidean ligament, loose triangular fragment in between axial and abaxial parts of the proximal component and brown focus of discoloration/porosity (pre-existing lesion):
A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through subchondral focus of brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The trabecular bone of the flexor surface is also highly compacted (sclerotic).
For better visualization of described fractures, please see attached pictures and drawings.
2. Severe scoring of the articular surfaces of the proximal sesamoid bones
3. Severe, focal, rounded (app. 0.3 mm in diameter) full thickness cartilage loss in the center of the articular surface of the lateral proximal sesamoid bone

B- SOFT TISSUES
1. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament. The transverse component follows the fracture line of the medial proximal sesamoid bone and courses further in lateral direction above the lateral proximal sesamoid bone. The longitudinal split affects distal third of the ligament and it progresses distally affecting the distal straight sesamoidean ligament resulting in complete longitudinal rupture and severe fraying of its proximal third.
2. Full thickness, transverse rupture of the palmar annular ligament
3. Marked fraying of fibers and hemorrhage of the deep digital flexor tendon at the level of the fetlock
4. Marked fraying of fibers of the dorsal surface, hemorrhage and complete transverse tear (app. 3-4 cm long) of the medial aspect of the superficial digital flexor tendon at the level of the fetlock
5. Marked to severe fraying of fibers and hemorrhage of the deep digital flexor tendon
6. Severe fraying of fibers and hemorrhage of the lateral and medial short and cruciate ligaments
7. Severe fraying of fibers of medial collateral ligament of the proximal sesamoid bones
8. Moderate, focal, dark red discoloration visible in the center of the cross section and extending for app. 4-5 cm at the level of mid-body of the suspensory ligament

C- MCIII
1. Severe scoring of the distal articular surface of MCIII
2. Severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
3. Severe hemorrhage with soft tissue erosion at the dorsal aspect of the supracondylar region of MCIII
4. Mild to moderate, biaxial palmar osteochondrosis with blue, focal subchondral bone discoloration visible through the flattened and degenerated cartilage of the medial and lateral condyles of the distal articular surface of MCIII

D- P1
1. Severe erosion of the dorsal and palmar margins of the proximal articular surface of P1
2. Mild lipping with red discoloration of the palmar margin of the proximal articular surface of P1

RIGHT FRONTLIMB
A- P1
1. Mild lipping of the dorsal margin of the proximal articular surface of P1
2. Moderate scoring of the proximal articular surface of P1
3. Mild, focal, cartilage ulceration of the dorsolateral aspect of the proximal articular surface of P1

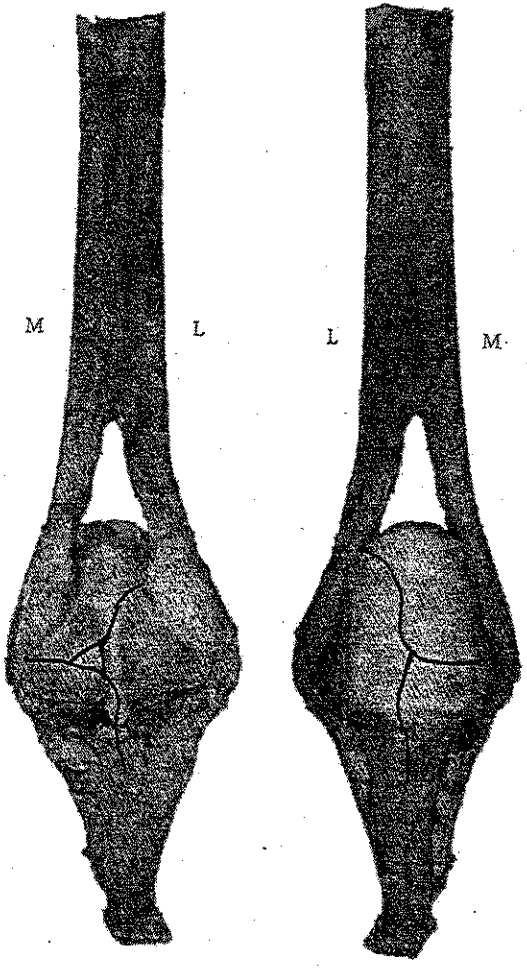
B- PROXIMAL SESAMOID BONES
1. Moderate to severe synovial hyperplasia with red discoloration underneath the bases of the proximal sesamoid bones
2. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
3. Moderate scoring lines of the articular surface of the proximal sesamoid bones

C- MCIII

1. Mild to moderate, biaxial palmar osteochondrosis with blue, focal subchondral bone discoloration visible through the flattened and degenerated cartilage of the medial and lateral condyles of the distal articular surface of MCIII
2. Mild to moderate scoring of the distal articular surface of MCIII
3. Moderate hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
4. Moderate hemorrhage with soft tissue erosion at the dorsal aspect of the supracondylar region of MCIII

No gross lesions/ abnormalities were identified in other bones of both distal front limbs examined from the chestnut to the hoof.

Accession # [redacted]
CC: MAS
Date: 1/31/13



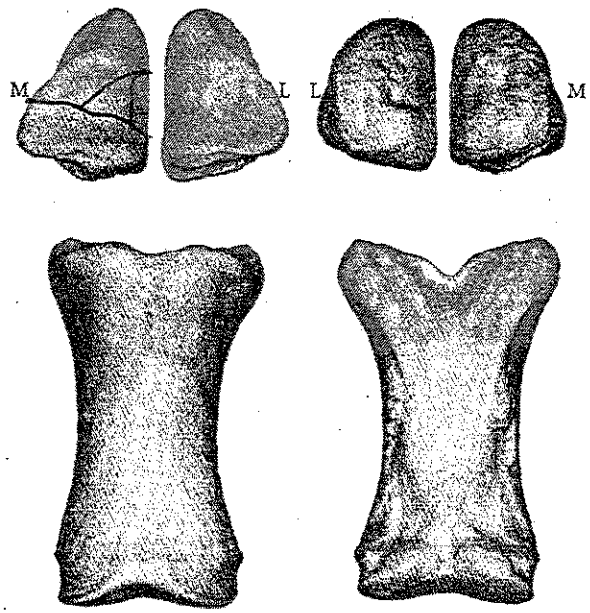

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? Yes (No)

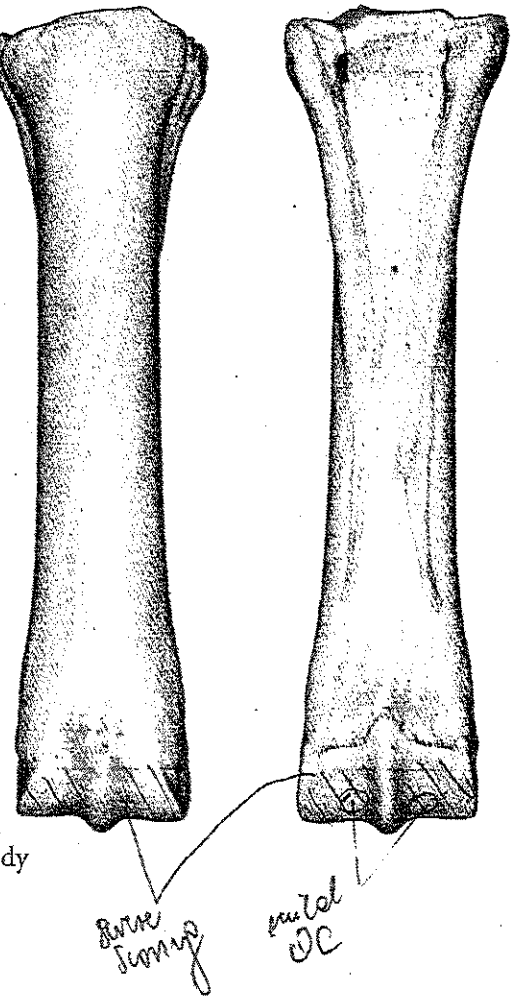
Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

Left Fetlock




Please circle affected leg
foreleg
hindleg



**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: Yes (No)

SL Medial branch SL Lateral branch SL Body

Intersesamoidean ligament: (Yes) No
(Longitudinal) Transverse

Distal Sesamoidean ligaments: (Yes) No ((straight and/or oblique)

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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**CAHFS Accession #:** [redacted]
**Addendum Version 1**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/19/2019 9:17:46AM

**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:** 01/18/2019 **Date Received:** 01/20/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | McAfoos, Jessie | 618-927-0908 | 730 Orange | Sierra Madre | CA | 91024 |
| Trainer | MACHOWSKY, MICHAEL | 626-483-2500 | 446 Highland Place | Monrovia | CA | 91016 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Female | Location on Track: | Past Wire |
| Taxonomy: | Thoroughbred Horse | Insured? | |

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

## Laboratory Findings/Diagnosis

A 3 year old Thoroughbred [redacted]) submitted with a history of right front biaxial proximal sesamoid bone fractures (mid-body configuration) with acute suspensory apparatus failure (closed injury).

Catastrophic breakdown of right front fetlock with

RIGHT FRONT

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones
a) Closed, simple, articular, slightly oblique, displaced, mid body fracture of the lateral proximal sesamoid bone
b) Closed, articular, transverse, comminuted, displaced, basilar fracture of the medial proximal sesamoid bone with probable predisposing lesion
2. Full thickness, transverse rupture of the intersesamoidean ligament

3. Marked fraying of fibers of the deep digital flexor tendons
4. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
5. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
6. Severe, longitudinal, short, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
7. Severe fraying of fibers and hemorrhage of the medial oblique distal sesamoidean ligament
8. Severe fraying of fibers and complete longitudinal tear of the lateral branch of the suspensory ligament
9. Moderate incomplete longitudinal tear, fraying of fibers and hemorrhage of body of the suspensory ligament

CHRONIC CHANGES:
1. Mild to moderate dorsal metacarpal disease with periosteum congestion, thickening and dark pink discoloration of the dorsal cortex
2. Moderate lipping of the dorsal and palmar margin of the proximal articular surface of P1
3. Mild to moderate, focal, biaxial thickening of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia)

LEFT FORELIMB

CHRONIC CHANGES
1. Mild dorsal metacarpal disease with periosteum congestion and thickening
2. Mild lipping of the dorsal margin of the proximal articular surface of P1
3. Mild to moderate, focal, biaxial thickening of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia)

## Case Summary

03/19/19: Case was re-opened due to minor corrections in CHRB Musculoskeletal field (typographical errors). Further testing is concluded.

01/25/19: The most important findings in the right forelimb are biaxial fractures of the proximal sesamoid bones. The injuries of the proximal sesamoid bones resulted in loss of support of the fetlock joint of the right forelimb.The aforementioned fractures may be related to the focal region of subtle discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the medial proximal sesamoid bone. Changes of similar nature could not be located in the proximal sesamoid bones of the contralateral limb.

## Clinical History

Right Foreleg: biaxial proximal sesamoid bone fractures (mid-body configuration) with acute suspensory apparatus failure (closed injury). Broke down during gallop out.

## Gross Observations

Necropsy of a 406 kg [redacted] Thoroughbred [redacted] with a [redacted] and [redacted] began at 12.05 pm on January 20, 2019.

The carcass was in good nutritional condition, with adequate amount of fat reserves, well fleshed and in moderate state of post-mortem decomposition. No significant gross abnormalities were observed in visceral organs. In particular, no gastric ulcers or laryngeal lesions were seen.

## CHRB Musculoskeletal

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

RIGHT FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones
a) Closed, simple, articular, slightly oblique, displaced, mid body fracture of the lateral proximal sesamoid bone
b) Closed, articular, transverse, comminuted, displaced, basilar fracture of the medial proximal sesamoid bone with probable predisposing lesion – the distal basilar fragment is divided into two roughly equal fragments in sagittal plane.

A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through subchondral focus of very subtle brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the abaxial surface/lateral suspensory branch insertion appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.

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

2. Severe scoring of the articular surfaces of the proximal sesamoid bones
3. Severe, full thickness cartilage loss along the fracture line on the medial proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament- the tear is following the fracture lines of the proximal sesamoid bones
2. Severe fraying of fibers and complete longitudinal split of the lateral branch of the suspensory ligament- the longitudinal rupture is a continuation of the fracture line propagating through the proximal sesamoid bones. The complete split propagates about 3 cm proximally and then turns into incomplete split and progresses all the way up to the mid-body of the suspensory ligament. The body of the suspensory ligament lateral from the tear is hemorrhagic.
3. Marked fraying of fibers on the dorsal surface of the deep digital flexor tendon at the level of the fetlock
4. Moderate fraying of fibers of the lateral and medial short and cruciate ligaments
5. Moderate fraying of fibers and incomplete longitudinal rupture of the collateral ligaments of the proximal sesamoid bones
6. Severe, biaxial fraying and hemorrhage of the medial distal oblique sesamoidean ligaments
7. Mild to moderate, focal, biaxial thickening of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia) in the proximal third

C- MCIII
1. Moderate, full thickness cartilage loss (semicircular, app. 1 cm in diameter) of the palmar margin of the medial condyle of the distal articular surface of MCIII
2. Mild to moderate dorsal metacarpal disease with marked periosteum thickening and congestion. The periosteum is strongly adhered to the cortical bone. There is also longitudinal focus (ca. 4 cm long) of dark pink discoloration of the cortical bone at the level of dorsal mid-shaft (presumably woven bone formation )
3. Mild scoring of the medial condyle of the distal articular surface of MCIII
4. Mild to moderate hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
5. Mild hemorrhage with soft tissue erosion at the dorsal aspect of the supracondylar region of MCIII

D- P1
1. Moderate lipping of the dorsal and palmar margin of the proximal articular surface of P1
2. Mild, focal, subtle cartilage ulceration along the dorsomedial margin of the proximal articular surface of P1

LEFT FRONT

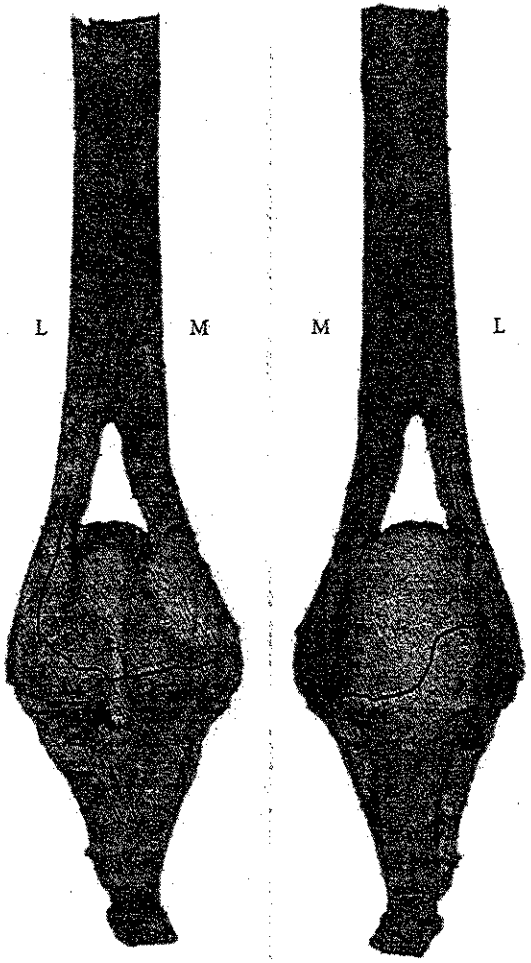
A- MCIII
1. Mild thickening and congestion of the dorsal periosteum, especially at the level of the mid MCIII. The periosteum is severely adhered to the cortical bone, making it exceptionally difficult to separate.

B- SOFT TISSUE
1. Mild to moderate, focal, biaxial, rounded thickening of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia) in the mid-length

C- P1
1. Mild lipping of the dorsal aspect of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

Accession # [redacted]
CC: MAS
Date: 01/24/19



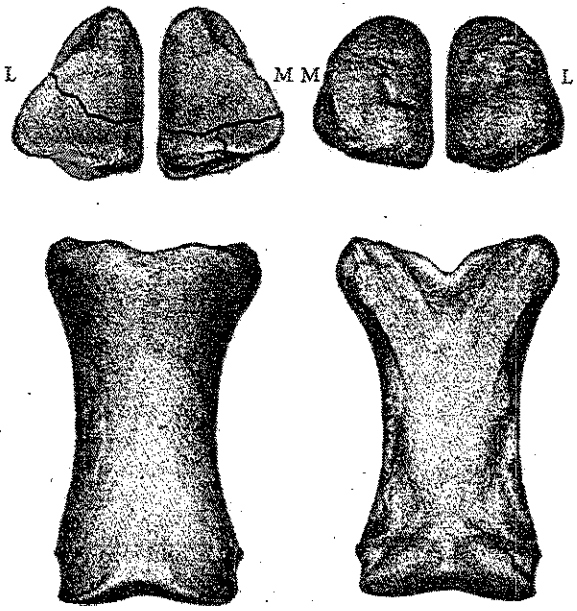

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? Yes (No)

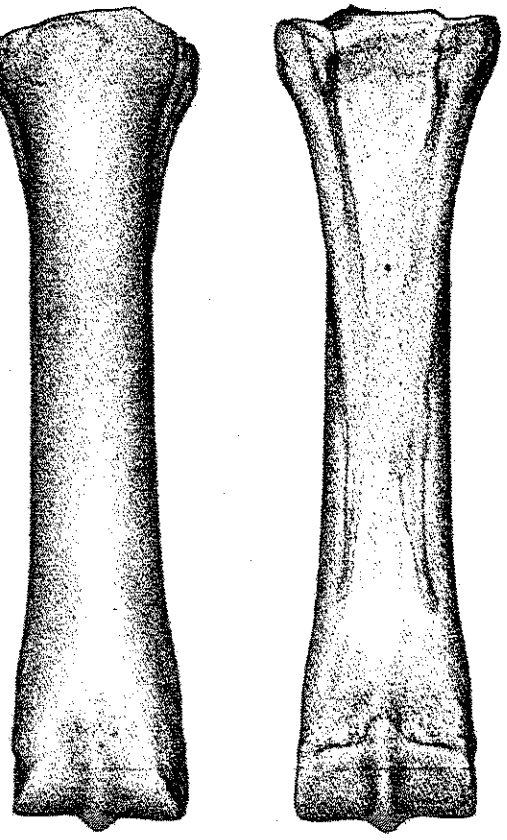
Joint capsule intact? (Yes) No

Joint luxated? Yes (No)

Right Fetlock




Please circle affected leg
(foreleg)
hindleg



**Involved Structures**

SDF tendon: Yes (No) DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

SL Medial branch (SL Lateral branch) SL Body

Intersesamoidean ligament: (Yes) No
Longitudinal (Transverse)

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

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: Yes (No)

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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105 W. Central Avenue, San Bernardino,
CA 92408-2113
(909) 383-4287
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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/29/2019 5:46:03PM

**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:** 03/14/2019 **Date Received:** 03/14/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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] | | |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | Baker, Rita L | 916-263-6038 | 1010 Hurley Way, Suite #300 | Sacramento | CA | 95825 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | STEAD, DANA | 970-310-4449 | Po Box 373 | South Pasaden | CA | 91031 |
| Trainer | BERNSTEIN, DAVID | 626-230-2565 | 7211 Haven Ave #E558 | Rancho Cucam | CA | 91701 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Female | Location on Track: | PAST WIRE |
| Taxonomy: | Thoroughbred Horse | Insured? | |

Medications: Dormosedan (Detomidine); Pentobarbital;

## Laboratory Findings/Diagnosis

A 3 year old [redacted] Thoroughbred [redacted] ([redacted]) submitted with history of bilateral compound metacarpophalangeal disarticulation, with biaxial proximal sesamoid bone fractures and upright pastern conformation noted on previous exam
Catastrophic breakdown of left and right front fetlocks, with:

LEFT FORELIMB

ACUTE CHANGES
1. Fracture of the medial proximal sesamoid bone- open, simple, articular, transverse, displaced, basilar
2. Severe, complete, longitudinal rupture of the medial branch of the suspensory ligament
3. Severe, multiple incomplete longitudinal splits and fraying of fibers of the lateral branch of the suspensory ligament
4. Chip fracture of the dorsolateral margin of the proximal articular surface of P1
5. Complete luxation of the fetlock joint- MCIII bone completely perforated the skin, which resulted in complete exposure of the

distal third of cannon bone
6. Open, simple, non-articular, transverse, displaced fracture of the MCII and MCIV
7. Severe, complete, transverse rupture of the medial and lateral collateral ligaments of the fetlock
8. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
9. Severe, full-thickness, transverse rupture, severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the deep digital flexor tendon
10. Severe, transverse, complete rupture, severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the superficial digital flexor tendon
11. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
12. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
13. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
14. Severe, full thickness cartilage loss of the mid-sagittal ridge of the distal articular surface of MCIII
15. Severe, longitudinal, full thickness cartilage loss of the abaxial margin of the medial condyle of the distal articular surface of MCIII

CHRONIC CHANGES:
1. Severe, biaxial palmar osteochondral disease with white, ellipsoidal subchondral bone discoloration (presumably necrotic bone/sequestrum) surrounded by blue rim (bruising) visible through the flattened cartilage overlying the condyles of distal MCIII
2. Severe, biaxial degeneration of the cartilage overlying articular surface of the distal MCIII- significant thinning

RIGHT FORELIMB

ACUTE CHANGES
1. Fracture of the lateral proximal sesamoid bone - open, simple, articular, transverse, displaced, apical
2. Fracture of the medial proximal sesamoid bone - open, comminuted, articular, transverse, displaced, basilar
3. Severe, complete, longitudinal rupture of the lateral branch of the suspensory ligament originating from bifurcation, multiple incomplete longitudinal splits and moderate fraying of fibers
4. Chip fracture of the dorsal margin of the proximal articular surface of P1
5. Complete luxation of the fetlock joint- MCIII bone completely perforated the skin, which resulted in complete exposure of the distal third of cannon bone
6. Open, simple, non-articular, oblique, displaced fracture of the MCII
7. Severe, complete, transverse rupture of the medial and lateral collateral ligaments of the fetlock
8. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
9. Severe, complete, transverse rupture, severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the deep digital flexor tendon
10. Severe, incomplete, transverse rupture, severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the superficial digital flexor tendon
11. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
12. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
13. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the straight distal sesamoidean ligament
14. Severe, multifocal, full thickness cartilage loss of the mid-sagittal ridge of the distal articular surface of MCIII
15. Severe, multifocal, full thickness cartilage loss of the abaxial margin of the medial condyle of the distal articular surface of MCIII

CHRONIC CHANGES
1. Severe, biaxial palmar osteochondral disease with white/yellowish, elipsoidal subchondral bone discoloration (presumably necrotic bone/sequestrum) surrounded by blue rim (bruising) visible through the flattened cartilage overlying the condyles of distal MCIII
2. Severe degeneration of the cartilage overlying articular surface of the distal MCIII- significant thinning
3. Moderate to severe, focal, blue subchondral bone discoloration visible through the cartilage of the dorsal aspect of the mid-sagittal ridge and along the abaxial margin of the medial condyle

Other findings:
- Moderate to severe, extensive gastric hyperkeratosis of non-glandular mucosa with moderate gastric ulceration along the margo plicatus (incidental)
- Splenomegaly (euthanasia artifact)
- Pulmonary congestion and edema (euthanasia artifact)

## Case Summary

03/20/19: The most important findings in the right and left forelimbs are open fractures of the proximal sesamoid bones, rupture of suspensory ligament and severe, bilateral palmar osteochondral disease. The latter injuries caused lateral displacement of both cannon bones and consequently skin laceration, which ultimately resulted in loss of support of the fetlock joints in both front limbs. The aforementioned fractures may be related to the focal regions of discoloration and bone porosity/osteopenic focus associated with fracture surfaces in the medial proximal sesamoid bones. Furthermore, the morphologic presentation of the palmar ostechondral disease affecting both front limbs equally was considered atypical due to the shape and extent of the noted changes. Usually formation of the sequestrum/necrotic bone is less extensive and rounded in shape. In this case, the stress applied to the palmar aspect of distal condyles encompassed a wider area of articular surface.

03/15/19 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

Bilateral forelegs-compound metacarpophalangeal disarticulations w/biaxial proximal sesamoid bone fractures (bilateral); Hx: shod with medial quarters removed LF/LH/RH; upright pastern conformation noted on previous exam.

## Gross Observations

Necropsy of a 3 year old, [redacted] Thoroughbred [redacted]), 454 kg, with [redacted], tattoo [redacted] commenced at 12:30 pm, March 14, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in mild post-mortem decomposition state. 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. Non-glandular gastric mucosa is extensively hyperkeratotic with moderate, multifocal ulcers (app. 1 cm in diameter) with elevated margins 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:

LEFT FORELIMB

A- PROXIMAL SESAMOID BONES
1. Fracture of the medial proximal sesamoid bones, open, simple, articular, transverse, displaced, basilar fracture of the medial proximal sesamoid bone

The subchondral bone is slightly discolored (red/brown) along the entire articular margin with darker/ more distinct focus (red) in abaxial aspect, which is considered as possible region of increased porosity. The fracture line propagates through this subchondral focus of red discoloration surrounded by highly compacted trabecular bone.

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

2. Mild scoring of the articular surfaces of the proximal sesamoid bones
3. Mild, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament rupture with sagittal component affecting straight distal sesamoidean ligament- the tear is following the fracture line of the medial proximal sesamoid bone, the other transverse component courses

above the lateral proximal sesamoid bone. Then the tear continues distally to merge with full-thickness, longitudinal rupture of the straight distal sesamoidean ligament
2. Severe, full-thickness, transverse rupture of the palmar annular ligament
3. Severe, complete, longitudinal rupture of the medial branch of the suspensory ligament at the level of the insertion on the fractured medial proximal sesamoid bone (ca. 4 cm long);
4. Severe, multiple incomplete longitudinal splits and severe fraying of fibers of the lateral branch of the suspensory ligament
5. Severe, full-thickness longitudinal split, which originates from the bifurcation and progresses for app. 6-7 cm proximally to turn into incomplete split and reach the proximal third of the suspensory ligament body (origin). The suspensory ligament body is markedly hemorrhagic.
6. Severe, complete, transverse rupture of medial and lateral collateral ligaments of the fetlock
7. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
8. Severe, complete, transverse rupture of the medial aspect (app. 2-3 cm), severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the deep digital flexor tendon
9. Severe, incomplete, transverse rupture (affecting app. ¾ width of the tendon), severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the superficial digital flexor tendon
10. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
11. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones
12. Moderate to severe proliferative synovitis of the fetlock joint

C- MCII
1. Open, simple, complete, non-articular, transverse, displaced fracture of the MCII- fracture resulted in complete separation of the button of the splint bone

D- MCIV
1. Open, simple, complete, non-articular, transverse, displaced fracture of the MCII- fracture resulted in complete separation of the button of the splint bone

E- MCIII
1. Severe, full thickness, longitudinal cartilage loss of the mid-sagittal ridge of the distal articular surface of MCIII
2. Severe, longitudinal, full thickness cartilage loss of the abaxial margin of the medial condyle of the distal articular surface of MCIII
3. Severe, biaxial palmar osteochondral disease with white, ellipsoidal subchondral bone discoloration (presumably necrotic bone/sequestrum) surrounded by blue rim (bruising) visible through the flattened cartilage overlying the condyles of distal MCIII- the cross section of the affected regions revealed yellow focus of the presumably necrotic subchondral bone surrounded by dark blood vessels (neovascularization).
4. Severe degeneration of the cartilage overlying articular surface of the distal MCIII- significant thinning
5. Severe scoring of the distal articular surface of MCIII
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 with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

F- P1
1. Chip fracture of the dorsolateral margin of the proximal articular surface of P1
2. Moderate, focal, rounded (ca. 0.5 cm in diameter) cartilage ulceration of the dorsomedial margin of the proximal articular surface of P1
3. Severe, biaxial, bony erosion with osteochondral fragmentation of the palmar aspect of the proximal articular surface of P1
4. Mild to moderate scoring lines of the proximal articular surface

RIGHT FORELIMB

A- PROXIMAL SESAMOID BONES
1. Fracture of the lateral proximal sesamoid bone, open, simple, articular, transverse, displaced, apical, avulsed with intersesamoidean ligament
2. Fracture of the medial proximal sesamoid bone, open, comminuted, articular, transverse, displaced, basilar- the basilar fragment is divided into 2 fragments in axial third by sagittal fracture line. The subchondral bone is slightly discolored (brown) along the entire articular margin with slightly darker/ more distinct focus in abaxial aspect, which may be considered as possible

region of increased porosity. The fracture line propagates through this subchondral focus of red discoloration surrounded by highly compacted trabecular bone. The changes are very similar to those seen in medial proximal sesamoid bone in left front. However, they seem to be more subtle. The fracture line propagates through this subchondral focus of discoloration surrounded by highly compacted trabecular bone.

For better visualization please see attached pictures and drawings.

3. Severe scoring of the articular surfaces of the proximal sesamoid bones

B- SOFT TISSUES
1. Severe, longitudinal rupture of the body of the suspensory ligament originating from bifurcation (ca. 6-7 cm long), resulting in complete separation of the lateral branch together with lateral aspect of the body of suspensory ligament accompanied by multiple incomplete longitudinal splits and moderate to severe fraying of fibers of the lateral branch
2. Full thickness, transverse intersesamoidean ligament rupture with sagittal component affecting straight distal sesamoidean ligament- the tear is following the fracture line of the medial proximal sesamoid bone, the other transverse component courses above the lateral proximal sesamoid bone. Then the tear continues distally to merge with full-thickness, longitudinal rupture of the straight distal sesamoidean ligament
3. Complete luxation of the fetlock joint- MCIII bone completely perforated the skin, which resulted in complete exposure of the distal third of cannon bone
4. Severe, complete, transverse rupture of medial and lateral collateral ligaments of the fetlock
5. Severe, complete, transverse rupture, severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the deep digital flexor tendon
6. Severe, incomplete, transverse rupture, severe fraying of fibers, hemorrhage, multiple longitudinal, incomplete splits of the superficial digital flexor tendon
7. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
8. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
9. Moderate thickening of the lateral lobe of the superficial digital flexor tendon at the level of distal P1

C- MCII
1. Open, simple, complete, non-articular, oblique, displaced fracture of the MCII- fracture resulted in complete separation of the button of the splint bone

D- MCIII
1. Severe, biaxial palmar osteochondral disease with white, ellipsoidal subchondral bone discoloration (presumably necrotic bone/sequestrum) surrounded by blue rim (bruising) visible through the flattened cartilage overlying the condyles of distal MCIII- the cross section of the affected regions revealed yellow focus of presumably necrotic subchondral bone surrounded by dark blood vessels (neovascularization).
2. Moderate to severe, focal, blue subchondral bone discoloration visible through the cartilage of the dorsal aspect of the mid-sagittal ridge and along the abaxial margin of the medial condyle
3. Severe, multifocal, irregularly shaped, full thickness cartilage loss of the mid-sagittal ridge of the distal articular surface of MCIII
4. Severe, multifocal, irregularly shaped, full thickness cartilage loss of the abaxial margin of the medial condyle of the distal articular surface of MCIII
5. Mild to severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
6. Mild to severe hemorrhage with bone erosion due to compression of the hypertrophic synovial pad (osteoclastic osteolysis) at the dorsal aspect of the supracondylar region of MCIII

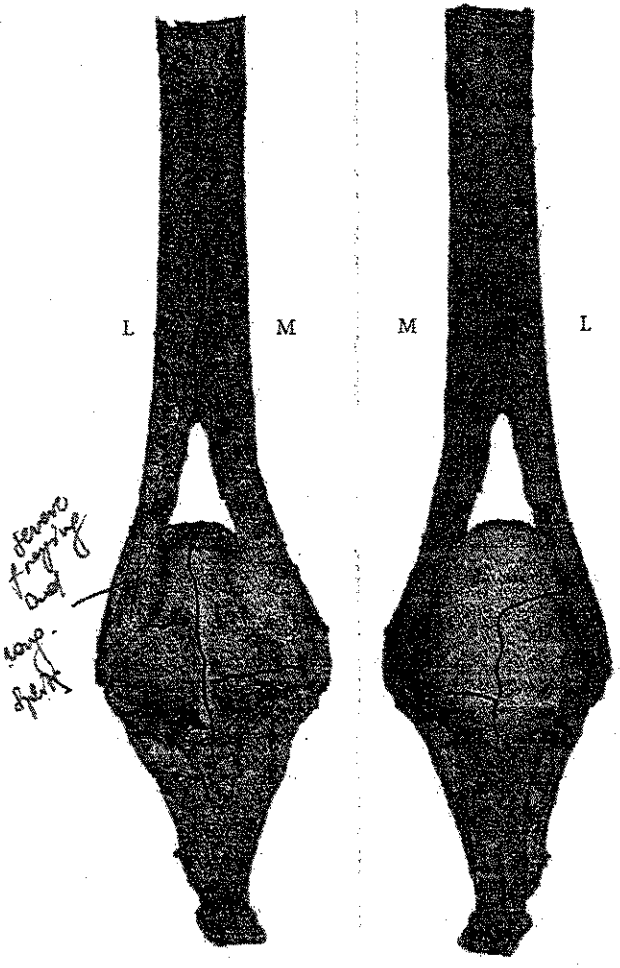
E- P1
1. Chip fracture of the dorsal margin of the proximal articular surface of P1
2. Severe, biaxial, bony erosion with osteochondral fragmentation of the palmar aspect of the proximal articular surface of P1
3. Mild to moderate scoring lines of the proximal articular surface

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the radio-carpal joint to the hoof.

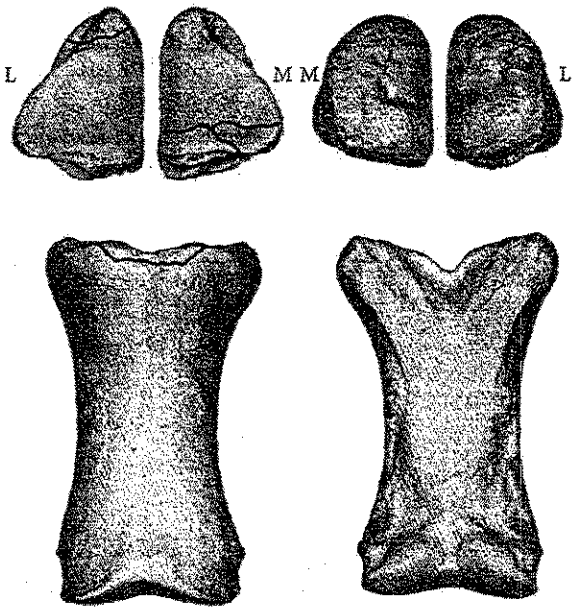
Accession # [redacted]
CC: MAS
Date: 3/15/19

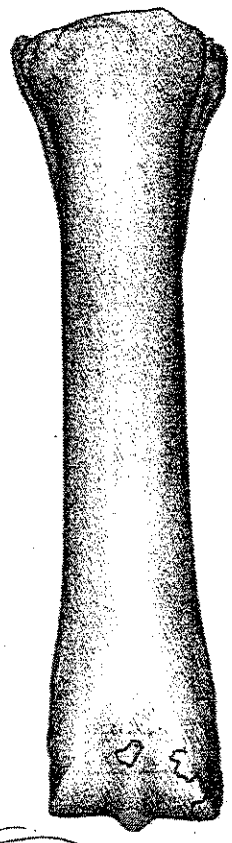
Right Fetlock

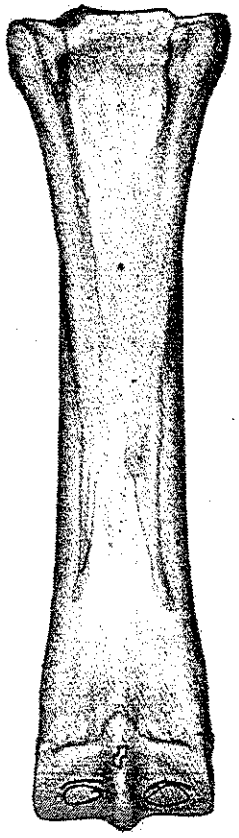
Please circle affected leg
foreleg
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)





**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

SL Medial branch (SL Lateral branch) (SL Body)

Intersesamoidean ligament: (Yes) No
(Longitudinal) (Transverse)

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

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? (Yes) No

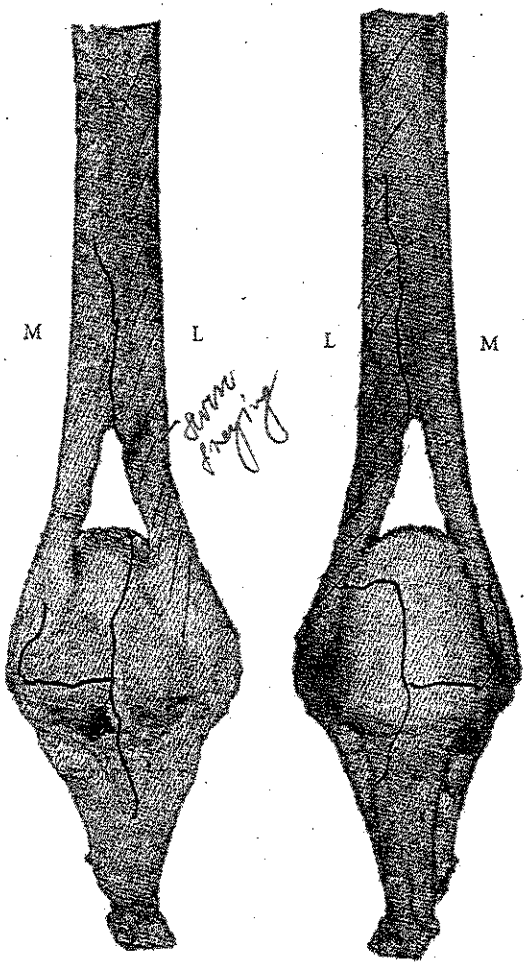
Joint capsule intact? Yes (No)

Joint luxated? (Yes) No

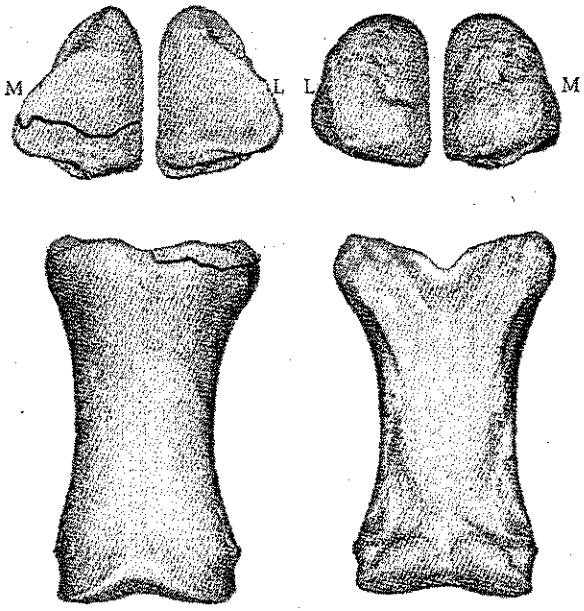
Accession # [redacted]
CC: MAS
Date: 3/15/19

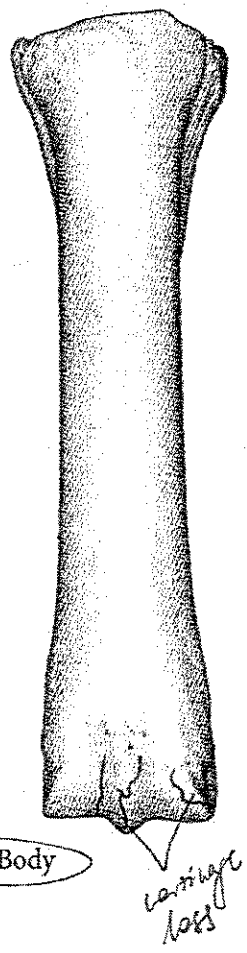
Left Fetlock

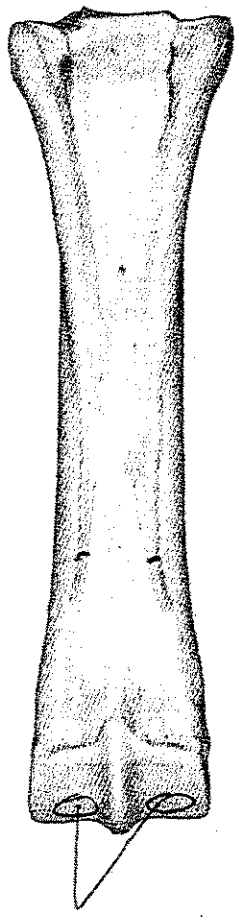
Please circle affected leg
foreleg
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)





**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) (SL Lateral branch) (SL Body)

Intersesamoidean ligament: (Yes) No

(Longitudinal) (Transverse)

Distal Sesamoidean ligaments: (Yes) No (straight) and/or (oblique)

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? (Yes) No

Joint capsule intact? Yes (No)

Joint luxated? (Yes) No

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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 1/29/2019 10:21:19AM

**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:** 12/30/2018 **Date Received:** 12/31/2018

**Comments:** CHRB
NEED [redacted]

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | Arcadia | CA | 91007 |
| Bill To | CALIFORNIA HORSE RACING BOARD | 916-263-6000 | 1010 Hurley Way Suite 300 | Sacramento | CA | 95825 |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | BROKKEN, TODD | 626-862-6198 | Po Box 970 | Sierra Madre | CA | 91025 |
| Trainer | Todaro/Hollendorfer, George/Jerry | 510-435-5482 | 1432 Sandpiper Spit | Richmond | CA | 94801 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 4.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | 1/2 MILE POL |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Dormosedan (Detomidine); Pentobarbital;

## Laboratory Findings/Diagnosis

A 4 year old [redacted] Thoroughbred [redacted] ([redacted]) with history of left front biaxial proximal sesamoid bone fracture with associated suspensory apparatus failure

LEFT FRONT

Catastrophic fetlock failure with:

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones (PSB)
a. medial PSB fracture: articular, complete, transverse, displaced, simple, mid-body
b. lateral PSB fracture: articular, complete, transverse, displaced, simple, apical with abaxial, comminuted component avulsed with lateral branch of suspensory ligament
2. Full thickness, transverse rupture of the palmar annular ligament

3. Full thickness, transverse rupture of palmar annular ligament
4. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
5. Marked, transverse incomplete tearing, fraying of fibers and hemorrhage of the superficial digital flexor tendon
6. Severe fraying of fibers, longitudinal splits and hemorrhage of the deep digital flexor tendon
7. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
8. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones
9. Mild fraying of fibers of the medial and lateral collateral ligaments of fetlock
10. Severe, longitudinal, full-thickness split and fraying of fibers of the distal straight sesamoidean ligament
11. Mild fraying of the lateral and medial oblique distal sesamoidean ligaments
12. Severe fraying of fibers and complete longitudinal split of the lateral branch of the suspensory ligament
13. Severe fraying of fibers, complete transverse rupture and multiple, short incomplete splits of the medial branch of the suspensory ligament
14. Severe scoring of the distal articular surface of MCIII
15. Moderate, focal, triangle-shaped cartilage ulceration of the distal articular surface of MCIII
16. Moderate scoring of the proximal articular surface of P1

CHRONIC CHANGES:
1. Severe palmar osteochondrosis with focal, biaxial, blue subchondral bone discoloration visible through the flattened cartilage of the distal articular surface of MCIII
2. Moderate lipping of the palmar aspect of the proximal articular surface of P1
3. Severe, biaxial, red cartilage discoloration adjacent to the sagittal groove of the proximal surface of P1
4. Severe, very deep erosion of the dorsal articular margin of the proximal articular surface of P1
5. Moderate, longitudinal, blue subchondral bone discoloration visible through the cartilage of the proximal articular surface of the third carpal bone

RIGHT FORELIMB

CHRONIC CHANGES

FETLOCK
Mild to moderate degenerative/osteoarthritic changes
1. Severe palmar osteochondrosis with focal, biaxial, blue subchondral bone discoloration visible through the flattened cartilage of the distal articular surface of MCIII
2. Moderate fibrillation of the transverse ridge on the distal articular surface of MCIII
3. Mild, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones
4. Moderate scoring lines of the articular surfaces of the proximal sesamoid bones
5. Mild lipping of the dorsal and palmar aspect of the proximal articular surface of P1
6. Mild, biaxial, cartilage ulceration of the dorsal aspect of the proximal articular surface of P1

Other findings
- Moderate, multifocal gastric hyperkeratosis with moderate to severe, multifocal to coalescing, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

1/10/19: The most important findings in the left forelimb are biaxial fractures of the proximal sesamoid bones. The injuries of the proximal sesamoid bones resulted in loss of support of the fetlock joint of the left forelimb. The aforementioned fractures may be related to the focal region of discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the medial proximal sesamoid bone. Changes of similar nature could not be localized in proximal sesamoid bones of the contralateral limb.

12/31/18 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

Left foreleg: Biaxial proximal sesamoid bone fractures (medial PSB - midbody; lateral PSB - apical) with associated suspensory apparatus failure.

## Gross Observations

Necropsy of a 4 year old, [redacted] Thoroughbred [redacted] ([redacted] with a [redacted] and tattoo [redacted] is commenced at 9:00 am, December 31, 2018. 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 a marked amount of 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 along the margo plicatus is moderately hyperkeratotic with multifocal (app. 1 cm- diameter) to coalescing (app. 3-4 cm x 6-7cm) , deep ulcers. 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 chestnut. Following changes were seen:

LEFT FRONT

A- CARPUS
1. Moderate periarticular lipping of the distal articular surface of radius
2. Moderate, focal, rounded (ca. 1 cm in diameter) cartilage ulceration on the proximal articular surface of radial carpal bone. The defect is covered by thin layer of pink connective tissue.
3. Mild to moderate, longitudinal cartilage ulceration (along the dorsal articular margin, ca. 4 cm long) on the distal articular surface of radial carpal bone
4. Moderate, longitudinal (along the dorsal articular margin, ca. 3cm), blue subchondral bone discoloration visible through the cartilage of the proximal articular surface of the third carpal bone
5. Moderate periarticular lipping of the bones constituting the proximal and distal carpal rows

B- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones (PSB)
a. medial PSB fracture: articular, complete, transverse, displaced, simple, mid-body
b. lateral PSB fracture: articular, complete, transverse, displaced, simple, apical with abaxial, comminuted component avulsed with lateral branch of suspensory ligament. The avulsed fragment is divided into three, roughly equal fragments.

A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through subchondral focus of marked dark red/brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the flexor surface appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.

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

2. Severe scoring of the articular surfaces of the proximal sesamoid bones

C- SOFT TISSUES
1. Full thickness, transverse rupture of the palmar annular ligament
2. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament- Y-shaped, propagates in a crescent direction at the level of the fracture lines and continues distally in a longitudinal direction between the PSBs, to merge with a complete tear of the the distal straight sesamoidean ligament
3. Marked, transverse incomplete tearing (medial aspect, ca. 3 cm long), fraying of fibers and hemorrhage of the superficial digital flexor tendon at the level of the proximal sesamoid bones
4. Severe fraying of fibers, longitudinal splits and hemorrhage of the deep digital flexor tendon at the level of the fetlock
5. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
6. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones
7. Mild fraying of fibers of the medial and lateral collateral ligaments of fetlock

8. Mild fraying of the lateral and medial oblique distal sesamoidean ligaments
9. Severe fraying of fibers and complete transverse rupture of the lateral branch of the suspensory ligament- the transverse rupture is a continuation of the fracture line propagating through the proximal sesamoid bones. Adjacent to the rupture there are multiple, short, incomplete splits. The part of the branch not affected by severe changes is moderately thickened.
10. Severe fraying of fibers, complete longitudinal split of lateral branch of the suspensory ligament progressing for ca. 3 cm proximally from the insertion on the lateral proximal sesamoid bone, then it turns into multiple incomplete splits coursing towards the bifurcation
11. Severe synovial hypertrophy with red discoloration underneath the bases of the proximal sesamoid bones

D- MCIII
1. Severe scoring of the distal articular surface of MCIII
2. Severe palmar osteochondrosis with focal, biaxial, blue subchondral bone discoloration visible through the flattened cartilage of the distal articular surface of MCIII
3. Moderate, focal, triangle-shaped ( app. 0.5 cm x 1 cm) cartilage ulceration between the mid sagittal ridge and transverse ridge of the distal articular surface of MCIII
4. Moderate hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
5. Moderate hemorrhage and soft tissue erosion with bone exposure at the dorsal aspect of the supracondylar region of MCIII

E- P1
1. Moderate lipping of the palmar aspect of the proximal articular surface of P1
2. Severe, biaxial, red cartilage discoloration adjacent to the sagittal groove of the proximal surface of P1
3. Severe, biaxial, very deep erosion of the dorsal articular margin of the proximal articular surface of P1- there is no cartilage and subchondral bone left, only rough, darkly discolored (greyish) trabecular bone

RIGHT FRONT

A - CARPUS
1. Mild periarticular lipping of the distal articular surface of radius
2. Mild, focal, rounded (ca. 1 cm in diameter) cartilage ulceration on the proximal articular surface of radial carpal bone. Thin layer of pink connective tissue covers the defect.
3. Mild to moderate, longitudinal cartilage ulceration (along the dorsal articular margin, ca. 3-4 cm long) on the distal articular surface of radial carpal bone
4. Mild, subtle, focal, blue subchondral bone discoloration visible through the cartilage of the proximal articular surface of the third carpal bone- located centrally, app. 3 cm in diameter
5. Mild to moderate periarticular lipping of the bones constituting the proximal and distal carpal rows

B- PROXIMAL SESAMOID BONES
1. Moderate scoring lines on articular surface of proximal sesamoid bones
2. Moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones

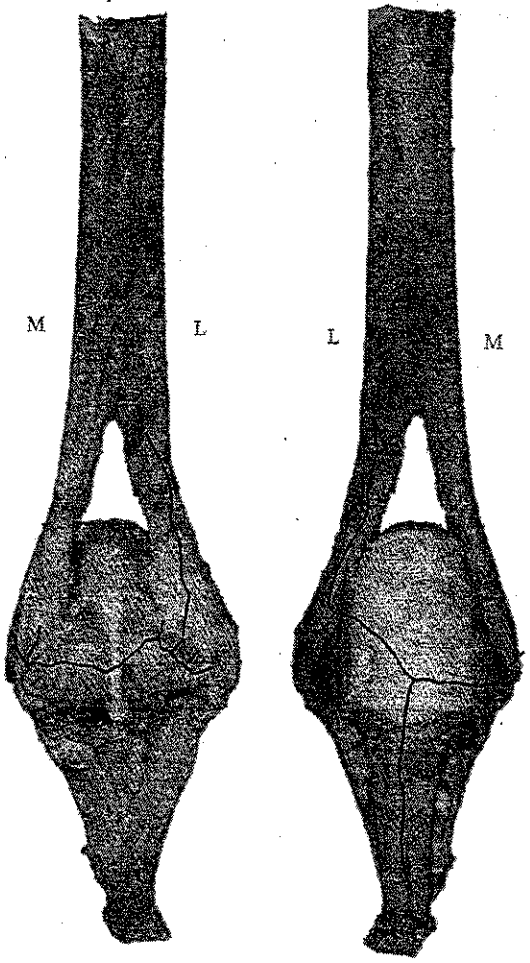
C- MCIII
1. Severe palmar osteochondrosis with focal, biaxial, blue subchondral bone discoloration visible through the flattened cartilage of the distal articular surface of MCIII
2. Moderate fibrillation of the transverse ridge on the distal articular surface of MCIII
3. Mild hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
4. Mild hemorrhage and soft tissue erosion with bone exposure at the dorsal aspect of the supracondylar region of MCIII

D- SOFT TISSUE
1. Moderate synovial thickening in the fetlock joint

E- P1
1. Mild lipping of the dorsal and palmar aspect of the proximal articular surface of P1
2. Mild, biaxial, cartilage ulceration of the dorsal aspect of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other bones of both distal front limbs examined from the chestnut to the hoof.

Accession # [redacted]
CC: MAS
Date: 01/09/18



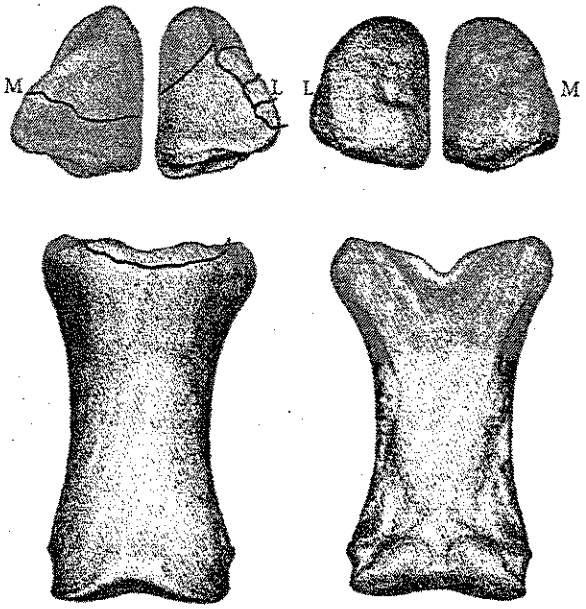

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? Yes (No)

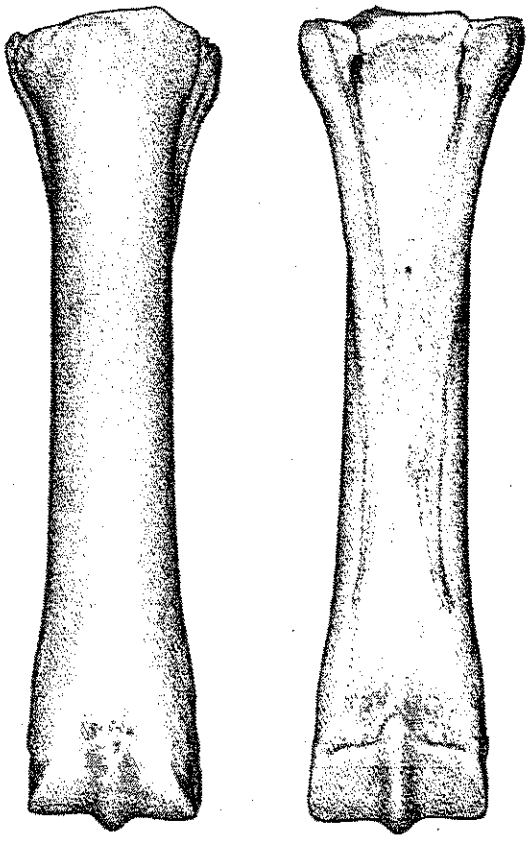
Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

Left Fetlock




Please circle affected leg
(foreleg)
hindleg



**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) (SL Lateral branch) (SL Body)

Intersesamoidean ligament: (Yes) No
(Longitudinal) (Transverse)

Distal Sesamoidean ligaments: (Yes) No (straight and/or oblique)

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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**CAHFS Accession #:** [redacted]
**Addendum Version 2**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 3/19/2019 9:17:26AM

**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:** 01/08/2019 **Date Received:** 01/08/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | CARPENTER, RYAN | 805-320-4811 | 33 Hidden Valley Rd | Monrovia | CA | 91016 |
| Trainer | HEADLEY, BRUCE | 626-446-0759 | 269 W Norman | Arcadia | CA | 91007 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Male | Location on Track: | |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: None Listed In The History;

## Laboratory Findings/Diagnosis

A 3 year old [redacted] Thoroughbred [redacted] ([redacted]) submitted with a history of left front biaxial sesamoid bone fracture with complete disruption of the suspensory apparatus

Catastrophic breakdown of left front fetlock with:

LEFT FRONT

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones
a) Closed, simple, articular, transverse, displaced, mid-body fracture of the medial proximal sesamoid bone with brown focus of discoloration/porosity (pre-existing lesion)
b) Closed, articular, transverse, comminuted, displaced, mid-body fracture of the lateral proximal sesamoid bone
2. Suspensory apparatus failure with severe fraying of both branches of the suspensory ligament; complete, transverse rupture

of the medial branch and incomplete, transverse rupture of the lateral branch
3. Full thickness, transverse rupture of the palmar annular ligament
4. Full thickness, transverse rupture of the intersesamoidean ligament
5. Marked fraying of fibers and incomplete transverse tears of the deep digital flexor tendon
6. Marked fraying of fibers and incomplete transverse tears of the superficial digital flexor tendon
7. Severe fraying of fibers and hemorrhage of the lateral and medial short and cruciate ligaments
8. Moderate fraying of fibers of lateral and medial collateral ligaments of proximal sesamoid bones
9. Mild to moderate fraying of fibers and hemorrhage of the medial and lateral oblique distal sesamoidean ligament
10. Moderate scoring of the distal articular surface of MCIII
11. Severe, focal, full thickness cartilage loss of the palmar aspect of the lateral condyle of the distal MCIII
12. Moderate, rounded, focal ulceration of the cartilage overlying medial condyle of the distal MCIII
13. Severe erosion of the dorsomedial margin of the proximal articular surface of P1

CHRONIC CHANGES:
1. Moderate lipping of the dorsal and palmar margin of the proximal articular surface of P1
2. Mild to moderate, biaxial, grey, focal subchondral bone discoloration visible through the cartilage, adjacent to the mid-sagittal ridge of the distal articular surface of MCIII

RIGHT FORELIMB

CHRONIC CHANGES

Fetlock
Moderate osteoarthritic changes
1. Moderate to severe lipping of the dorsal and palmar margin of the proximal articular surface of P1
2. Moderate, biaxial ulceration of the dorsal margin of the proximal articular surface of P1
3. Moderate scoring of the distal articular surface of MCIII
4. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
5. Moderate scoring lines of the articular surface of the proximal sesamoid bones

Other findings:
- Mild to moderate, multifocal gastric hyperkeratosis with mild, multifocal, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

03/19/19: Case was re-open due to minor corrections in 'CHRB Musculoskeletal' field (typographical errors). Further testing is concluded.

01/30/19: The most important finding in the left forelimb is biaxial fracture of the proximal sesamoid bones. The injuries of the proximal sesamoid bones resulted in loss of support of the fetlock joint of the left forelimb. The reason of the aforementioned fractures may be related to the focal region of brown discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the medial proximal sesamoid bone. However, besides moderate osteoarthritis in the right front fetlock, changes of similar nature could not be located in the proximal sesamoid bones in contralateral limb.

01/08/18 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

Left front biaxial sesamoid bone fracture with complete disruption of the suspensory apparatus - working (non-starter) works started in late October.

## Gross Observations

Necropsy of a 2 year old, [redacted] Thoroughbred [redacted] ([redacted]), 488 kg, with [redacted], tattoo [redacted] is commenced at 2:40 pm, January 8, 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). On the left and right kidneys, there are two focal irregular areas (app. 2 cm x 3 cm) of capsular thickening (presumably capsular fibrosis). The stomach contains green, soft roughage and grain particles. Non-glandular gastric mucosa along the margo plicatus is mildly to moderately hyperkeratotic with multifocal (app. 0,5-1 cm- diameter), shallow ulcers. 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 chestnut. Following changes were seen:

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1.Fracture of the proximal sesamoid bones
a) Closed, articular, transverse, comminuted, displaced, mid-body fracture of the lateral proximal sesamoid bone- the proximal fracture segment is divided into 3 fragments. The axial fragment is the largest one, wedge-shaped. The other two abaxial fragments are triangular and avulsed with lateral branch of the suspensory ligament.
b) Closed, simple, articular, transverse, displaced, mid-body fracture of the medial proximal sesamoid bone with brown focus of discoloration/porosity (pre-existing lesion):
A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through subchondral focus of very subtle brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the abaxial surface/lateral suspensory branch insertion appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.
For better visualization of described fractures, please see attached pictures and drawings.
2. Moderate scoring of the articular surfaces of the proximal sesamoid bones
3. Severe, full thickness cartilage loss along the fracture line on the medial proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament- the tear is following the fracture lines of the proximal sesamoid bones
2. Suspensory apparatus failure with severe fraying of both branches of the suspensory ligament up to bifurcation (dorsal and palmar surfaces are equally affected); complete, transverse rupture of the medial branch and incomplete, transverse rupture of the lateral branch as the continuation of the fracture lines of the proximal sesamoid bones.
3. Full thickness, transverse rupture of the palmar annular ligament
4. Marked fraying of fibers and incomplete transverse tears of the lateral and medial edge (app. 1 cm long) of the deep digital flexor tendon
5. Marked fraying of fibers and incomplete transverse tears of the lateral (app. 1 cm long) and medial (app. 2 cm long) edge of the superficial digital flexor tendon
6. Severe fraying of fibers and hemorrhage of the lateral and medial short and cruciate ligaments
7. Moderate fraying of fibers of lateral and medial collateral ligaments of proximal sesamoid bones
8. Mild to moderate fraying of fibers and hemorrhage of the medial and lateral oblique distal sesamoidean ligament

C- MCIII
1. Severe, focal, longitudinal (app. 1cm x 0.2 cm) full thickness cartilage loss of the palmar aspect of the lateral condyle of the distal MCIII
2. Moderate, rounded (app. 0.5cm in diameter), focal ulceration of the cartilage overlying medial condyle of the distal MCIII, adjacent to the transverse ridge
3. Moderate scoring of the medial condyle of the distal articular surface of MCIII
4. Moderate to severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
5. Moderate to severe hemorrhage with soft tissue erosion at the dorsal aspect of the supracondylar region of MCIII
6. Mild to moderate, biaxial, grey, focal, rounded (app. 0.7 cm in diameter) subchondral bone discoloration visible through the cartilage, adjacent to the mid-sagittal ridge of the distal articular surface of MCIII

D- P1
1. Severe erosion of the dorsomedial margin of the proximal articular surface of P1
2. Moderate lipping of the dorsal and palmar margin of the proximal articular surface of P1
3. Mild scoring of the proximal articular surface of P1

RIGHT FRONT

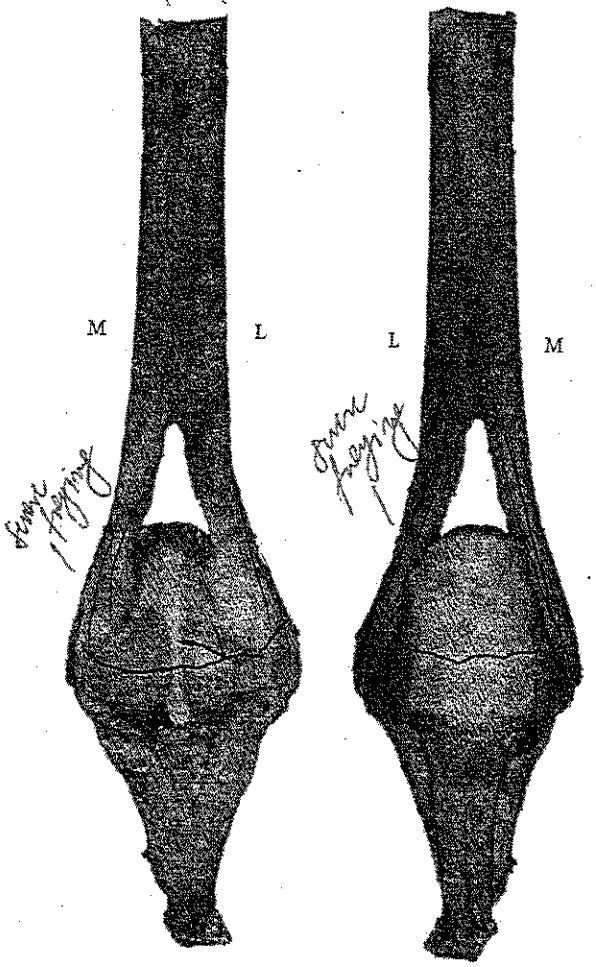
A- MCIII
1. Moderate scoring of the distal articular surface of MCIII

B- P1
1. Moderate to severe lipping of the dorsal and palmar margin of the proximal articular surface of P1
2. Moderate, biaxial ulceration of the dorsal margin of the proximal articular surface of P1

C- PROXIMAL SESAMOID BONES
1. Moderate, biaxial apical modeling with irregular bony outgrowth of the proximal sesamoid bones
2. Moderate scoring lines of the articular surface of the proximal sesamoid bones

No gross lesions/ abnormalities were identified in other structures of both distal front limbs examined from the chestnut to the hoof.

Accession # [redacted]
CC: MAS
Date: 01/30/19



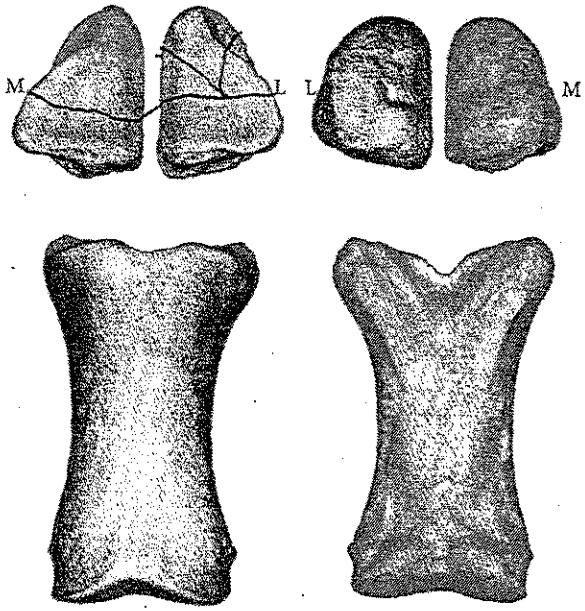

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? Yes (No)

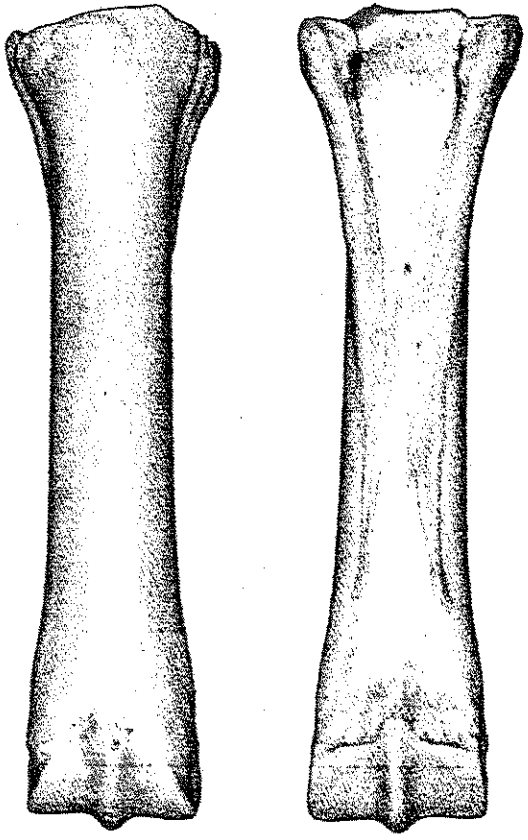
Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

Left Fetlock




Please circle affected leg
foreleg
hindleg



**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) (SL Lateral branch) SL Body

Intersesamoidean ligament: (Yes) No
Longitudinal (Transverse)

Distal Sesamoidean ligaments: Yes (No) (straight and/or oblique)

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 2/7/2019 10:56:01AM

**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:** 01/25/2019 **Date Received:** 01/25/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Blue, Melinda J | 626-233-9922 | 307 San Pascual Ave | Pasadena | CA | 91050 |
| Trainer | KORINER, BRIAN | 510-774-5347 | 369 Ewing Dr | Pleasanton | CA | 94566 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 7.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | 7/8th pole |
| Taxonomy: | Thoroughbred Horse | Insured? | |

Medications: Acepromazine; Dormosedan (Detomidine); Lasix (Furosemide); Pentobarbital; Torbugesic (Butorphanol);

## Laboratory Findings/Diagnosis

A 7 year old [redacted] Thoroughbred [redacted] [redacted]') with history of left hind sesamoid fracture with suspensory apparatus failure and possible condylar component

Catastrophic left hind fetlock breakdown with

LEFT HINDLIMB
ACUTE CHANGES
1. Closed, comminuted, complete, displaced, articular, parasagittal, lateral condylar fracture of the MTIII with the presence of pre-existing lesion (biaxial plantar osteochondral disease, see chronic changes 1.)
2. Fractures of the proximal sesamoid bones
a) Closed, simple, complete, displaced, articular, transverse, apical fracture of the medial proximal sesamoid bone
b) Closed, comminuted, complete, displaced, articular, avulsion fracture of the axial margin of the lateral proximal sesamoid bone

3. Closed, highly comminuted, complete, displaced, articular fracture of the proximal half of P1
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 apparatus failure with severe fraying, complete splits and hemorrhage resulting in complete rupture 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. Moderate fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones
12. Moderate fraying of fibers of the medial and collateral ligaments of fetlock
13. Severe, longitudinal, full-thickness split and fraying of fibers of the straight distal sesamoidean ligament
14. Moderate fraying of fibers and hemorrhage of the dorsal surface of the superficial and deep digital flexor tendons
15. Full thickness, transverse rupture of the plantar annular ligament
16. Severe scoring the distal articular surface of MTIII
17. Severe, full thickness, extensive cartilage loss of the distal articular surface of MTIII
18. Severe scoring of the proximal articular surface of P1

CHRONIC CHANGES:
1. Severe, biaxial plantar ostechondral disease with blue, subchondral bone discoloration visible through the cartilage of the medial condyle and subtle, brown, focal discoloration and porosity of the subchondral bone visible on both opposing surfaces of the fractured lateral condyle of the distal MTIII
2. Moderate, biaxial, rounded thickening of the oblique distal sesamoidean ligaments (presumably chondroid metaplasia)

RIGHT HINDLIMBS

CHRONIC CHANGES
Mild to moderate osteoarthritis of the fetlock joint
1. Moderate plantar ostechondral disease with focal, uniaxial, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MTIII accompanied by located centrally, rounded cartilage depression
2. Mild transverse ridge arthrosis with cartilage fibrillation of the distal articular surface of MTIII
3. Mild to moderate scoring of the distal articular surface of MTIII
4. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
5. Mild to moderate scoring lines of the articular surfaces of the proximal sesamoid bones
6. Mild to moderate, biaxial, basilar, irregular bony outgrowth (osteophytosis) of the lateral proximal sesamoid bone
7. Moderate, biaxial, focal cartilage ulceration with fibrillation of the dorsal margin of the proximal articular surface of P1
8. Moderate lipping of the dorsal and plantar aspect of the proximal articular surface of P1

Other fidnings:
- Moderate, multifocal gastric hyperkeratosis with mild to moderate, multifocal to coalescing, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

02/05/19 The most important findings in the left hindlimb are lateral condylar fracture of cannon bone, biaxial fracture of proximal sesamoid bones, comminuted fracture of proximal phalanx and suspensory apparatus failure. The latter injuries resulted in loss of support of the fetlock joint of the left hindlimb.
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 left cannon bone.

01/25/19 No significant findings were identified in visceral organs. At the time of necropsy, both hind 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

Left hind fetlock bilateral sesamoids with suspensory apparatus possible condylar. Working.

## Gross Observations

Necropsy of a 7 year old, [redacted] Thoroughbred [redacted], 519 kg, with a [redacted], tattoo [redacted] is commenced at 12:20 pm, January 25, 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 foam, the lungs are mottled pink to red, spongy and wet (euthanasia artifact). The spleen is severely enlarged and congested (euthanasia artifact). The stomach contains green, soft roughage and grain particles. Non-glandular gastric mucosa along the margo plicatus is moderately hyperkeratotic with multifocal (app. 0,5-1 cm - diameter) to coalescing (app. 4 cm x 1,5cm), relatively shallow ulcers. The intestinal tract is unremarkable, and the small colon contains formed feces.
Both hind limbs are removed at the level of the chestnut for further examination.

## CHRB Musculoskeletal

Both hind limbs were examined distally from the mid-shaft of tibia. Following changes were seen:

LEFT HIND
A- MTIII
1. Closed, simple, complete, displaced, articular, parasagittal, lateral condylar fracture of the MTIII with the presence of pre-existing lesion

The lateral condylar fragment is app. 10 cm long. The condylar fracture is coursing through blue subchondral bone discoloration. The opposing surfaces of the fracture reveal focus of brown discoloration of increased bone porosity (osteopenic focus) surrounded by highly compacted/sclerotic bone. The proximal edges of the of the condylar fragment are slightly irregular due to comminution which resulted in separation of multiple, small, irregularly shaped fragments, mostly from the dorsal aspect.

2. Severe scoring of the distal articular surface of MTIII
3. Severe, extensive, full thickness cartilage loss extending from the dorsal edge of the articular surface of medial condyle and sagittal ridge to the transverse ridge of the distal MTII
4. Severe hemorrhage accompanied by soft tissue hypertrophy at the plantar aspect of the supracondylar region of MTIII
5. Severe hemorrhage and bone erosion due to hypertrophic synovial pad at the dorsal aspect of the supracondylar region of MTIII
6. Severe, biaxial plantar osteochondral disease with blue, subchondral bone discoloration visible through the cartilage of the medial condyle and subtle, brown, focal discoloration and porosity of the subchondral bone visible on both opposing surfaces of the fractured lateral condyle of the distal MTIII

B- PROXIMAL SESAMOID BONES
1. Fractures of the proximal sesamoid bones
a) Closed, simple, complete, displaced, articular, transverse, apical fracture of the medial proximal sesamoid bone
b) Closed, 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 2 smaller pieces, which are firmly attached to the latter ligament.
3. Severe, full thickness cartilage loss along the fracture line and triangular, located on the abaxial margin 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, articular fracture of the proximal half of P1- The main fracture line is crescent and courses through the intermediate groove dividing the proximal articular surface into medial and lateral components. The medial fragment is slightly bigger and consists of 3 pieces- axial containing the part of intermediate groove and plantar separating the plantar eminence from the rest of the proximal articular surface. The lateral fracture component is divided into two major fragments, also created by separation of the plantar eminence from the rest of the proximal surface.
For better visualization of the fractures described above, please see attached pictures and drawings.
2. Severe scoring of the proximal articular surface of P1

D- SOFT TISSUES
1. Full thickness, transverse rupture of the plantar annular ligament

2. Suspensory apparatus failure- the longitudinal complete splits originating from the level of the fracture line of the medial proximal sesamoid bone result in complete rupture of the medial suspensory branch. Severe fraying and incomplete longitudinal splits progress all the way proximally, up to proximal third of the body of the suspensory ligament, affecting mainly its plantar 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 superficial and deep digital flexor tendons
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 fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of the proximal sesamoid bones
8. Moderate fraying of fibers of the medial and collateral ligaments of fetlock
9. Severe synovial hypertrophy with red discoloration underneath the bases of the proximal sesamoid bones
10. Severe synovial thickening in the fetlock joint (proliferative synovitis)

RIGHT HIND

A- PROXIMAL SESAMOID BONES
1. Mild to moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones (osteophytosis)
2. Mild to moderate scoring lines of the articular surfaces of the proximal sesamoid bones
3. Mild to moderate, biaxial, basilar, irregular bony outgrowth (osteophytosis) of the lateral proximal sesamoid bone

B- MTIII
1. Moderate plantar ostechondral disease with focal, uniaxial, blue subchondral bone discoloration (bruising) visible through the flattened cartilage of the lateral condyle of the distal articular surface of MTIII accompanied by located centrally, rounded cartilage depression
2. Mild transverse ridge arthrosis with cartilage fibrillation of the distal articular surface of MTIII
3. Mild to moderate scoring of the distal articular surface of MTIII

C- SOFT TISSUE
1. Moderate synovial thickening in the fetlock joint (proliferative synovitis)

D- P1
1. Moderate, biaxial, focal cartilage ulceration with fibrillation of the dorsal margin of the proximal articular surface of P1
2. Moderate lipping of the dorsal and plantar aspect of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other bones of both distal hind limbs examined from the mid-shaft of tibia.

Acc # [redacted]

Date MAS

CC 02/09/18

Proximal Phalanx - Left

**Nature:**

- [ ] Open
- [ ] Simple
- [x] Complete
- [x] Displaced
- [x] Articular
- [x] Closed
- [x] Comminuted
- [ ] Incomplete
- [ ] Non-displaced
- [ ] Non-articular

**Location:**

- [x] Proximal Epiphyseal
- [x] Proximal Metaphyseal
- [x] Proximal Physeal
- [ ] Diaphyseal
- [ ] Distal Epiphyseal
- [ ] Distal Metaphyseal
- [ ] Distal Physeal

**Configuration:**

- [x] Axial (longitudinal)
- [ ] Transverse
- [ ] Segmental
- [ ] Butterfly
- [ ] Oblique

**Direction:**

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

**Pre-existing callus:**

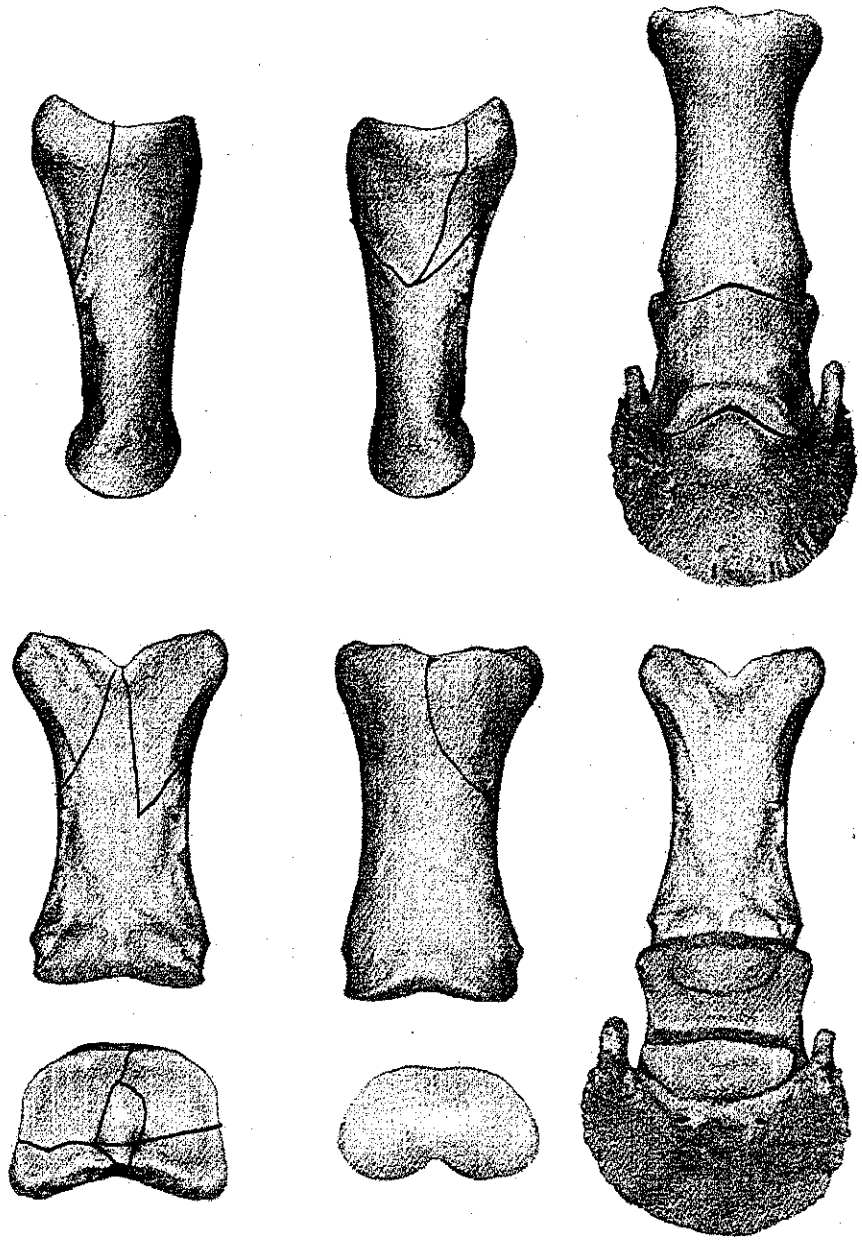
- [x] Yes
- [x] Unable to evaluate
- [ ] No

**Legend:**

Callus

Incomplete Fx

M Missing fragments

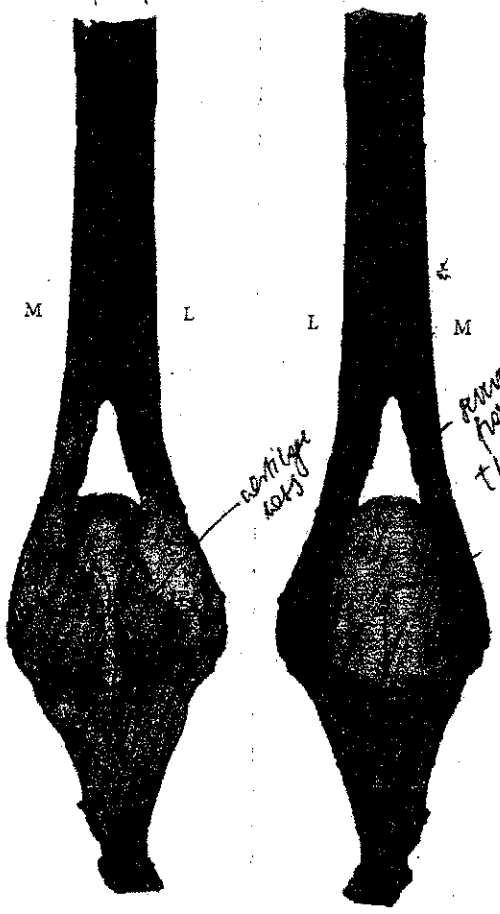


[redacted]

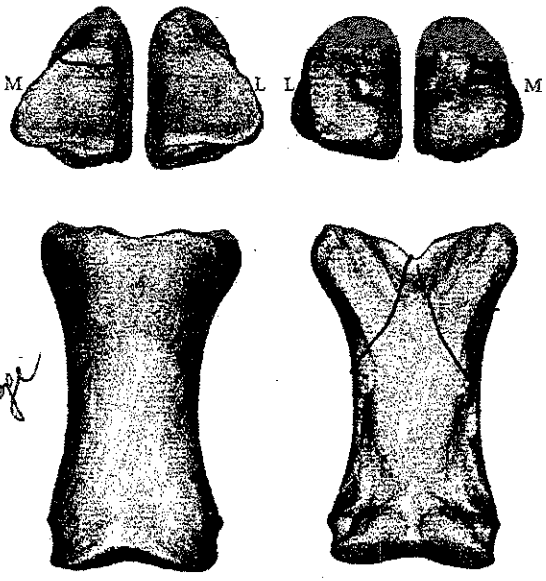
Accession # [redacted]
CC: MAS
Date: 02/04/19

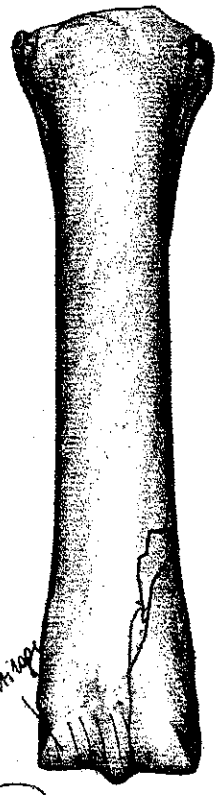
Left Fetlock

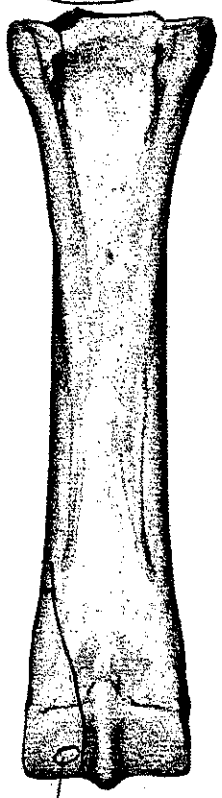
Please circle affected leg
foreleg
hindleg




Susp. App. (dorsal) Susp. App. (palmar/plantar)





p1 – separate drawings

**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

SL Medial branch (SL Lateral branch) (SL Body)

Intersesamoidean ligament: (Yes) No
(Longitudinal) (Transverse)

Distal Sesamoidean ligaments: (Yes) No (straight and/or oblique)

Collateral ligaments: Yes (No)

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? Yes (No)

Joint capsule intact? Yes (No)

Joint luxated? Yes (No)

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**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 1/30/2019 10:36:28AM

**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:** 01/04/2019 **Date Received:** 01/05/2019

**Comments:** CHRB - Need owners complete infor.

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | Arcadia | CA | 91007 |
| Bill To | CALIFORNIA HORSE RACING BOARD | 916-263-6000 | 1010 Hurley Way Suite 300 | Sacramento | CA | 95825 |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Stead, Dana | 626-574-6355 | 285 W Huntington | Arcadia | CA | 91006 |
| Trainer | DESORMEAUX, KEITH | 972-672-2961 | 10740 Placide Road | Maurice | LA | 70555 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 3.00 Years | Track Surface: | Turf |
| Gender: | Neutered Male | Location on Track: | 3/8 Pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Dormosedan (Detomidine); Pentobarbital;

## Laboratory Findings/Diagnosis

A 3 year old [redacted] Thoroughbred [redacted] submitted with a history of left front fetlock luxation with open, complete lateral condylar fracture, biaxial proximal sesamoid bone fractures and suspensory apparatus failure

Catastrophic breakdown of left front fetlock with suspensory apparatus failure

LEFT FRONT

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones (PSB)
a) Open, biaxial, comminuted, articular, transverse, apical with predisposing lesion located within the medial proximal sesamoid bone
2. Complete, open luxation of the fetlock joint with palmar displacement of the distal MCIII. There is no lateral condylar fracture of MCIII.
3. Full thickness, transverse rupture of the palmar annular ligament

4. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament
5. Marked, transverse incomplete tearing, incomplete split, fraying of fibers of the superficial digital flexor tendons
6. Marked, complete split and fraying of fibers of the deep digital flexor tendons
7. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
8. Severe fraying of fibers and complete transverse rupture of the lateral and medial collateral ligaments of fetlock
9. Severe fraying of fibers and complete longitudinal rupture of the collateral ligaments of the proximal sesamoid bones
10. Severe, longitudinal, full-thickness split, fraying of fibers and hemorrhage of the distal straight sesamoidean ligament
11. Severe, biaxial fraying and hemorrhage of the distal oblique sesamoidean ligaments
12. Severe fraying of fibers and complete longitudinal split of the lateral branch of the suspensory ligament
13. Severe fraying of fibers and complete transverse rupture of the medial branch of the suspensory ligament
14. Severe scoring of the distal articular surface of MCIII
15. Mild to moderate scoring of the proximal articular surface of P1
16. Severe erosion of the dorsal margin of the proximal articular surface of P1

CHRONIC CHANGES:
1.Mild to moderate dorsal metacarpal disease with periosteum thickening and red discoloration

RIGHT FORELIMB

CHRONIC CHANGES
1. Mild thickening of the dorsal periosteum at the level of the mid MCIII
2. Moderate transverse ridge arthrosis with pitting of the cartilage of the distal articular surface of MCIII
3. Moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones
4. Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1
5. Moderate thickening of the body of the suspensory ligament accompanied by dark red discoloration visible on the cross section

Other findings
- Moderate, multifocal gastric hyperkeratosis with mild, multifocal to coalescing, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

01/12/19 The gross examination of both front limbs did not confirm the presence of the lateral condylar fracture of the left cannon bone. The most important findings in the left forelimb are biaxial fractures of the proximal sesamoid bones. The injuries of the proximal sesamoid bones resulted in loss of support of the fetlock joint of the left 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 medial proximal sesamoid bone. Changes of similar nature could not be located in the proximal sesamoid bones in contralateral limb.

01/06/19 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

Left foreleg: open, complete, displaced lateral condylar fracture with biaxial proximal sesamoid bone fractures (comminuted, displaced) and suspensory apparatus failure.

## Gross Observations

Necropsy of a 3 year old, [redacted] Thoroughbred [redacted] ([redacted]), 455kg, with a [redacted] tattoo [redacted] is commenced at 10:35 am, January 6, 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 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 along the margo plicatus is moderately hyperkeratotic with multifocal (app. 0,5 cm- diameter) to coalescing (app. 1-2 cm), shallow ulcers. 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 chestnut. Following changes were seen:

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones (PSB)
a. Open, biaxial, comminuted, articular, transverse, apical with predisposing lesion located within medial proximal sesamoid bone
A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through subchondral focus of marked dark red/brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the abaxial surface/lateral suspensory branch insertion appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.
For better visualization of described fractures, please see attached pictures and drawings.
2. Severe scoring of the articular surfaces of the proximal sesamoid bones
3. Severe, focal, crescent shape, full thickness cartilage loss located on the apex of the lateral proximal sesamoid bone

B- SOFT TISSUES
1. Full thickness, transverse rupture of the palmar annular ligament
2. Full thickness, transverse and longitudinal rupture of the intersesamoidean ligament- Y-shaped, propagates in a crescent direction at the level of the fracture lines and continues distally in a longitudinal direction between the PSBs, to merge with a tear of the palmar aspect of the distal straight sesamoidean ligament progressing up to its proximal third
3. Complete, open luxation of the fetlock joint with palmar displacement of the distal MCIII
4. Marked, transverse incomplete tearing (short, originating from the medial and lateral edge), incomplete split (roughly at the mid-width, ca. 5cm long), fraying of fibers of the superficial digital flexor tendons at the level of the fetlock
5. Marked, complete split (roughly at the mid-width, ca. 6-7 cm long) and fraying of fibers of the deep digital flexor tendons at the level of the fetlock
6. Severe fraying of fibers of the lateral and medial short and cruciate ligaments
7. Severe fraying of fibers and complete transverse rupture of the lateral and medial collateral ligaments of fetlock
8. Severe fraying of fibers and complete longitudinal rupture of the collateral ligaments of the proximal sesamoid bones
9. Severe, biaxial fraying and hemorrhage of the distal oblique sesamoidean ligaments
10. Severe fraying of fibers and complete longitudinal split of the lateral branch of the suspensory ligament- the longitudinal rupture is a continuation of the fracture line propagating through the proximal sesamoid bones. The complete split propagates all the way up to bifurcation of the suspensory ligament
11. Severe fraying of fibers and complete transverse rupture of the medial branch of the suspensory ligament at the level of the fracture
12. Moderate thickening of the body of the suspensory ligament with dark red discoloration visible on the cross section

C- MCIII
1. Severe scoring of the distal articular surface of MCIII- the cartilage overlying the distal MCIII (especially medial condyle) is severely degenerated, thinned with very deep and wide scoring lines
2. Severe hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
3. Severe hemorrhage with bone erosion at the dorsal aspect of the supracondylar region of MCIII
4. Mild, ellipsoidal (ca. 0,5 cm x 0,3 cm), cartilage ulceration of the mid-sagittal ridge of distal MCIII
5. Mild to moderate dorsal metacarpal disease with periosteum thickening and two longitudinal foci (ca. 3 cm long) of red discoloration (presumably woven bone formation at the dorsal aspect of mid MCIII)

D- P1
1. Mild to moderate scoring of the proximal articular surface of P1
2. Severe erosion of the dorsal margin and axial margins of palmar eminences of the proximal articular surface of P1

RIGHT FRONT

A- PROXIMAL SESAMOID BONES
1. Moderate, biaxial, apical, irregular bony outgrowth of the proximal sesamoid bones
2. Moderate synovial hyperplasia with red discoloration underneath the bases of the proximal sesamoid bones

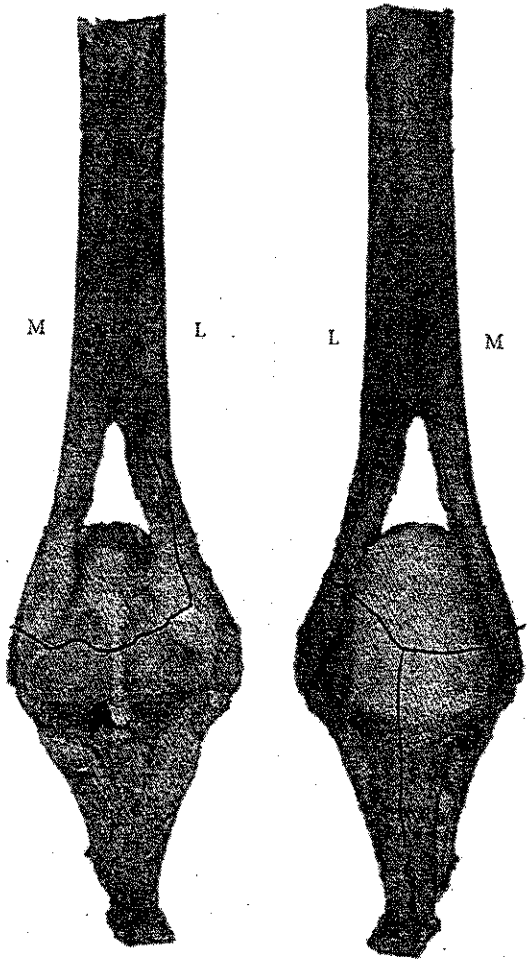
B- MCIII
1. Mild thickening of the dorsal periosteum at the level of the mid MCIII
2. Moderate transverse ridge arthrosis with pitting of the cartilage of the distal articular surface of MCIII

C- SOFT TISSUE
1. Moderate synovial thickening in the fetlock joint
2. Moderate thickening of the body of the suspensory ligament accompanied by dark red discoloration visible on the cross section

D- P1
1.Moderate lipping of the dorsal and palmar aspect of the proximal articular surface of P1

No gross lesions/ abnormalities were identified in other bones of both distal front limbs examined from the chestnut to the hoof.

Accession # [redacted]
CC: MAS
Date: 01/11/19



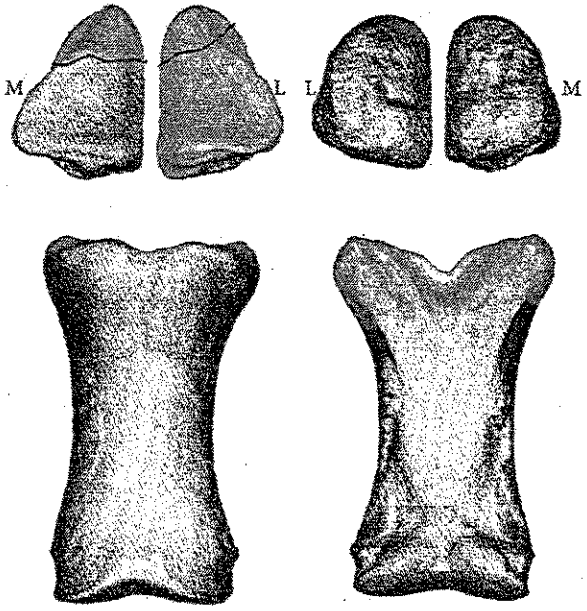

Susp. App. (dorsal) Susp. App. (palmar/plantar)

Open wound? (Yes) No

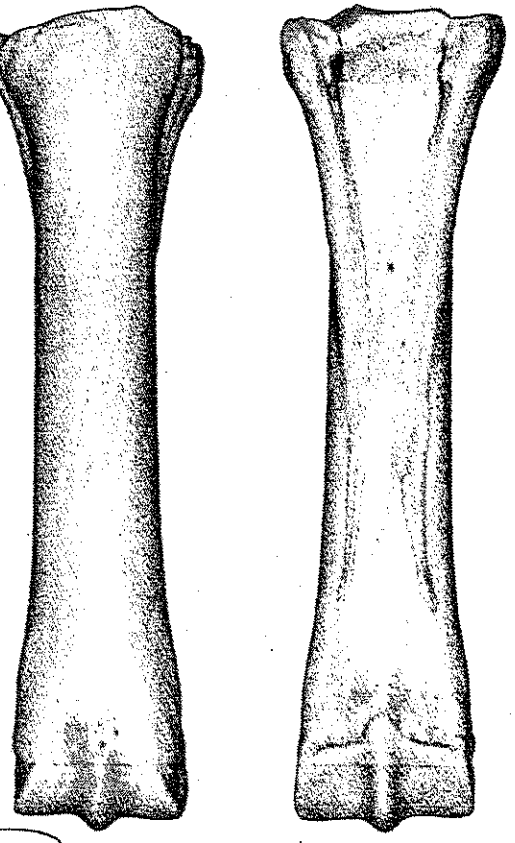
Joint capsule intact? Yes (No)

Joint luxated? (Yes) No

Left Fetlock




Please circle affected leg
(foreleg)
hindleg



**Involved Structures**

SDF tendon: (Yes) No DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) (SL Lateral branch) (SL Body)

Intersesamoidean ligament: (Yes) No

(Longitudinal) (Transverse)

Distal Sesamoidean ligaments: (Yes) No (straight and/or oblique)

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

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CA 92408-2113
(909) 383-4287
www.cahfs.ucdavis.edu

**CAHFS Accession #:** [redacted]
**FINAL REPORT**
**Ref.#:** [redacted]

**Coordinator:** Monika Samol, DVM, Resident
**E-Signed and Authorized by:** Samol, Monika on 1/29/2019 6:42:00PM

**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:** 01/05/2019 **Date Received:** 01/06/2019

**Comments:** CHRB: Need owner infor.

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | Arcadia | CA | 91007 |
| Bill To | CALIFORNIA HORSE RACING BOARD | 916-263-6000 | 1010 Hurley Way Suite 300 | Sacramento | CA | 95825 |
| Report To | UZAL, FRANCISCO | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | Stead, Dana | 626-574-6355 | 285 W Huntington | Arcadia | CA | 91006 |
| Trainer | Barba, Alexis | 626-824-9575 | 1018 Cawston Ave | South Pasaden | CA | 91030 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Race |
| Age: | 3.00 Years | Track Surface: | Turf |
| Gender: | Male | Location on Track: | 1/8th Pole |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Dormosedan (Detomidine); Pentobarbital;

## Laboratory Findings/Diagnosis

A 3 year old [redacted] Thoroughbred [redacted] with history of right front fetlock luxation with open, complete lateral condylar fracture, biaxial proximal sesamoid bone fractures and suspensory apparatus failure

Catastrophic breakdown of right front fetlock with

RIGHT FRONT

ACUTE CHANGES
1. Fracture of the proximal sesamoid bones
a) Open, simple, articular, slightly oblique, displaced, apical/mid-body fracture of the lateral proximal sesamoid bone
b) Open, articular, transverse, simple, displaced, basilar fracture of the medial proximal sesamoid bone with osteopenic focus (pre-existing lesion)
2. Complete lateral luxation of the distal MCIII- the lateral displacement of the entire distal articular surface of MCIII resulted in skin laceration

3. Complete transverse rupture and severe fraying of fibers of the lateral and medial collateral ligaments of the fetlock
4. Full thickness, transverse rupture of the intersesamoidean ligament
5. Marked fraying of fibers of the deep digital flexor tendons
6. Severe fraying of fibers of the lateral and medial and cruciate ligaments
7. Severe fraying and transverse rupture of the lateral short sesamoidean ligament
8. Moderate fraying of the medial short sesamoidean ligament
9. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones
10. Severe fraying of fibers and complete transverse of the lateral branch of the suspensory ligament
11. Moderate incomplete longitudinal tear, fraying of fibers and hemorrhage of body of the suspensory ligament
12. Severe scoring and extensive full thickness cartilage loss of the distal articular surface of MCIII
13. Severe erosion of the dorsal and palmar margin of the proximal articular surface of P1

CHRONIC CHANGES:
1. Moderate lipping with pink discoloration of the dorsal periarticular margin of the proximal articular surface of the carpal intermediate bone

LEFT FORELIMB

CHRONIC CHANGES
1. Blue/grey, subtle subchondral bone discoloration visible through the cartilage of the abaxial aspect of the articular surface of the medial proximal sesamoid bone
2. Moderate thickening with dark red discoloration of the lateral short sesamoidean ligament
3. Mild to moderate lipping with pink discoloration of the dorsal and palmar margin of the proximal articular surface of P1
4. Moderate lipping with pink discoloration of the dorsal periarticular margin of the proximal articular surface of the carpal intermediate bone

Other findings:
- Mild, multifocal gastric hyperkeratosis with mild, multifocal, non-glandular gastric ulceration along the margo plicatus (incidental)
- Pulmonary congestion and edema (euthanasia artifact)
- Splenomegaly (euthanasia artifact)

## Case Summary

01/28/19: The most important findings in the right forelimb are biaxial fractures of the proximal sesamoid bones. The injuries of the proximal sesamoid bones resulted in loss of support of the fetlock joint of the right forelimb. The aforementioned fractures may be related to the focal region of discoloration and bone porosity/osteopenic focus associated with the fracture surfaces in the medial proximal sesamoid bone. Changes of similar nature could be located in the proximal sesamoid bones in contralateral limb, which is consistent with bilateral, repetitive, overuse injury.

01/06/18 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, complete lateral condylar fracture with biaxial proximal sesamoid bone fractures and suspenso0ry apparatus failure; luxated metacarpophalangeal joint.

## Gross Observations

Necropsy of a 3 year old, [redacted] Thoroughbred [redacted] ([redacted] 448kg, with a [redacted] tattoo [redacted] is commenced at 11:35 am, January 6, 2019. The carcass is in good nutritional condition, with appropriate musculature development, good deposits of adipose tissue, and in moderate 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 along the margo plicatus is mildly hyperkeratotic with multifocal (app. 0,5 cm- diameter), shallow ulcers. 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 chestnut. Following changes were seen:

RIGHT FRONT

A- PROXIMAL SESAMOID BONES
1. Fracture of the proximal sesamoid bones
a) Open, simple, articular, slightly oblique, displaced, apical/mid-body fracture of the lateral proximal sesamoid bone
b) Open, articular, transverse, simple, displaced, basilar fracture of the medial proximal sesamoid bone with predisposing lesion: A region of increased porosity is present at the abaxial aspect of the articular surface on both opposing fracture surfaces of the medial proximal sesamoid bone. The fracture line propagates through subchondral focus of brown discoloration surrounded by highly compacted trabecular bone (sclerosis) and adjacent to the cartilage of the articular surface of medial proximal sesamoid bone. The subchondral bone of the lateral proximal sesamoid bone and the trabecular bone adjacent to the abaxial surface/lateral suspensory branch insertion appear to be highly compacted (sclerotic) on both opposing surfaces of the fracture.
For better visualization of described fractures, please see attached pictures and drawings.

2. Severe scoring of the articular surfaces of the proximal sesamoid bones
3. Severe, full thickness cartilage loss along the fracture line on the medial proximal sesamoid bones

B- SOFT TISSUES
1. Full thickness, transverse intersesamoidean ligament- the tear is following the fracture lines of the proximal sesamoid bones
2. Severe fraying of fibers and complete transverse rupture of the lateral branch of the suspensory ligament- the transverse rupture is a continuation of the fracture line propagating through the proximal sesamoid bones. The severe fraying and hemorrhage affects the dorsal surface of the entire branch and the lateral aspect of the mid-body of the suspensory ligament up to its proximal third.
3. Marked fraying of fibers on the dorsal surface of the deep digital flexor tendons at the level of the fetlock
4. Complete lateral luxation of the distal MCIII- the lateral displacement of the entire distal articular surface of MCIII resulted in skin laceration
5. Complete transverse rupture and severe fraying of fibers of the lateral and medial collateral ligaments of the fetlock
6. Full thickness, transverse rupture of the intersesamoidean ligament
7. Severe fraying of fibers of the lateral and medial and cruciate ligaments
8. Severe fraying and transverse rupture of the lateral short sesamoidean ligament
9. Moderate fraying of the medial short sesamoidean ligament
10. Severe fraying of fibers and incomplete transverse rupture of the lateral and medial collateral ligaments of proximal sesamoid bones

C- MCIII
1. Two foci of severe, full thickness ulceration in the middle of the mid-sagittal ridge (app. 1.5 cm x 0.5 cm) , adjacent to it, just above the transverse ridge of the medial condyle there is square shaped ( app. 1cm x 1cm) cartilage ulceration.
2. Severe, full thickness cartilage loss along the medial and lateral margin of the palmar aspect of the distal articular surface of MCIII (medial condyle is more affected)
3. Severe scoring of the distal articular surface of MCIII
4. Severe to moderate hemorrhage accompanied by soft tissue hypertrophy at the palmar aspect of the supracondylar region of MCIII
5. Severe hemorrhage with soft tissue erosion at the dorsal aspect of the supracondylar region of MCIII

D- P1
1. Severe erosion of the dorsal and palmar margin of the proximal articular surface of P1

E- CARPUS
1. Moderate lipping with pink discoloration of the dorsal periarticular margin of the proximal articular surface of the carpal intermediate bone

LEFT FRONT

A- PROXIMAL SESAMOID BONES
1. Mild, biaxial apical modeling with subtle, irregular bony outgrowth of the proximal sesamoid bones
2. Blue/grey, focal, subtle subchondral bone discoloration visible through the cartilage of the abaxial aspect of the articular surface of the medial proximal sesamoid bone

B- SOFT TISSUE
1. Moderate thickening with dark red discoloration of the lateral short sesamoidean ligament

C- P1
1. Mild to moderate lipping with pink discoloration of the dorsal aspect of the proximal articular surface of P1

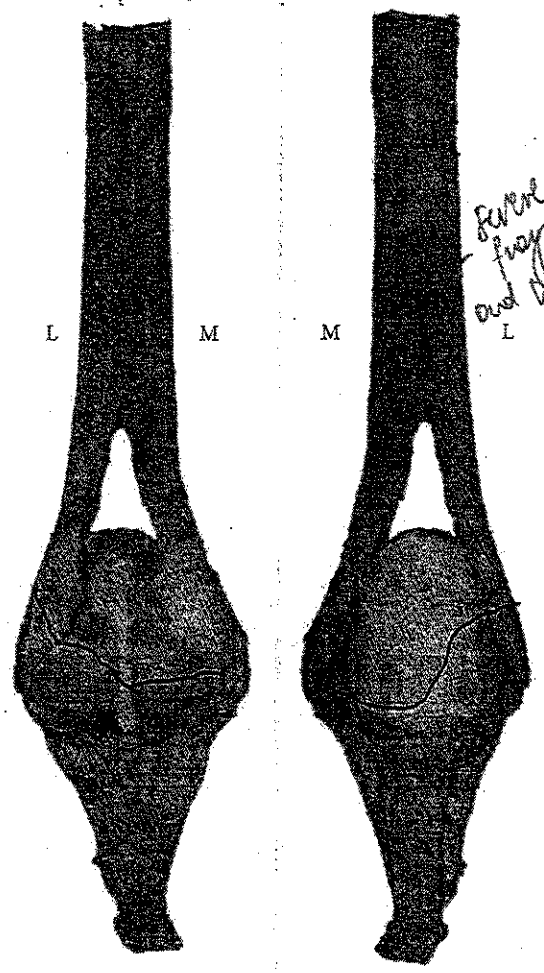
D- CARPUS
1. Moderate lipping with pink discoloration of the dorsal periarticular margin of the proximal articular surface of the carpal intermediate bone

No gross lesions/ abnormalities were identified in other bones of both distal front limbs examined from the chestnut to the hoof.

Accession # [redacted]
CC: MAS
Date: 01/28/19

Right Fetlock

Please circle affected leg
foreleg
hindleg

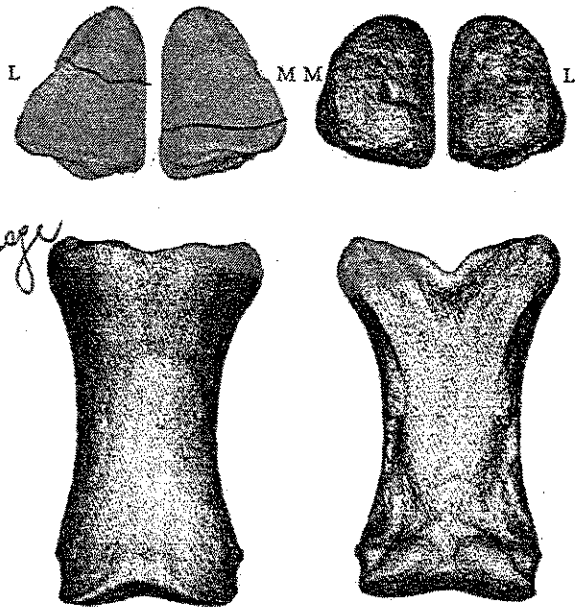


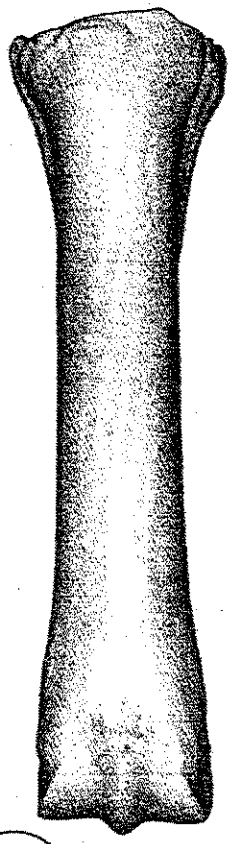

Susp. App. (dorsal)

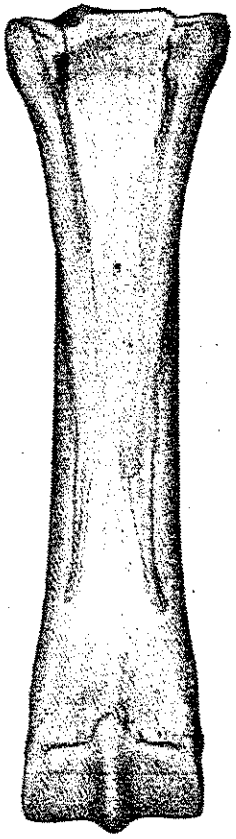



Susp. App. (palmar/plantar)

Severe fracture and hemorrhage





**Involved Structures**

SDF tendon: Yes (No) DDF tendon: (Yes) No

Suspensory ligament: (Yes) No

(SL Medial branch) (SL Lateral branch) (SL Body)

Intersesamoidean ligament: (Yes) No

Longitudinal (Transverse)

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

Collateral ligaments: (Yes) No

Collateral Sesamoidean Ligaments: (Yes) No

Cruciate and/or Short Sesamoidean Ligaments (Yes) No

Open wound? (Yes) No

Joint capsule intact? Yes (No)

Joint luxated? (Yes) No

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**CAHFS Accession #:** [redacted]
**Addendum Version 2**
**Ref.#:** [redacted]

**Coordinator:** Francisco Uzal, DVM, MSc, PhD, Dipl. ACVP
**E-Signed and Authorized by:** Uzal, Francisco A. on 10/16/2019 4:13:48PM

**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:** 02/18/2019 **Date Received:** 02/18/2019

**Comments:** CHRB

## Case Contacts

| | | | | | | |
|---|---|---|---|---|---|---|
| Submitter | GRANDE, TIM | 626-574-6355 | 285 W Huntington Dr, Gate 7 | 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 | 909-383-4287 | Cahfsl | San Bernardino | CA | 92408 |
| Report To | ARTHUR, RICK | 626-665-8130 | 311 E Grand View Ave | Sierra Madre | CA | 91024 |
| Attending Vet | BLEA, JEFF A | 626-886-1688 | 282 W. Sierra Madre Blvd | Sierra Madre | CA | 91024 |
| Trainer | Puype, Mike | 310-422-9063 | 100 Colony Drive | Arcadia | CA | 91066 |

## CHRB - Related Information

| | | | |
|---|---|---|---|
| Horse's Name: | [redacted] | Human Injury? | No |
| Tattoo: | [redacted] | Death Related to: | Training |
| Age: | 3.00 Years | Track Surface: | Dirt |
| Gender: | Neutered Male | Location on Track: | Past Wire |
| Taxonomy: | Thoroughbred Horse | Insured? | N |

Medications: Lasix (Furosemide);

## Laboratory Findings/Diagnosis

Gelding, history of not working well and dying

Presumptive acute heart failure with severe pulmonary edema

Other lab test results
1-Arsenic detected in liver (low concentration; likely incidental)
2-Other heavy metals within normal range
3-No bacterial pathogens isolated from liver or lung
4-Negative Salmonella spp. PCR on liver
5-No parasite eggs detected in feces

## Case Summary

2-19-19: The cause of death of this horse was not evident on gross examination and is currently under investigation. A full diagnostic work up is currently under way. I will keep you posted with our results. In the meantime, please do not hesitate to contact me if you have any questions about this report.

3-7-19: The cause of death of this horse was not yet determined despite extensive laboratory testing. Arsenic was detected at low concentration in the liver. Because no lesions compatible with intoxication by this heavy metal were detected, this is considered a likely incidental finding. Heavy metal screen of kidney is under way. Additional toxicology results to follow.

3-13-19: Arsenic was not detected in kidney, which is consistent with the previous comment about arsenic detected in liver being an incidental finding. Testing is now concluded.

## Clinical History

Horse was working-rider said did not feel right (was not interested in working) around the quarter pole-at the 1/16 pole rider eased to jog-horse was wobbly, then the horse collapsed just past the wire (sudden death). DOA

## Gross Observations

Necropsy of a 473 kg [redacted] with [redacted] began at 11:40 am on February 18, 2019. Chip: [redacted]; [redacted]

The carcass was in good nutritional condition, with adequate amount of fat reserves, well fleshed and in fresh to mild state of post-mortem decomposition.

The lungs were congested and firm with a diffuse fleshy consistency. There was a small amount of stable froth in the trachea and lower airways. No other significant gross abnormalities were observed in the rest of the carcass. In particular, thorough examination of the heart and paramedial section of the head did not reveal gross abnormalities.

## Bacteriology

**BACTERIAL AEROBIC CULTURE**

| Animal/Source | Specimen | Specimen Type | Results |
|---|---|---|---|
| [redacted] | [redacted] | Liver Swab | No growth after 48 hours |
| [redacted] | [redacted] | Lung Swab | No growth after 48 hours |

**Salmonella RT PCR Screen & culture**

| Animal/Source | Specimen | Specimen Type | Results |
|---|---|---|---|
| [redacted] | [redacted] | Liver Swab | Negative |

## Histology

Sections of heart, skeletal muscle, kidney, spleen, liver, lung, stomach, jejunum, colon, tongue, duodenum, and adrenal gland are examined.

Changes found:

1-Lung: congestion, acute, diffuse, severe

## Parasitology

**FECAL EXAM - FLOTATION**

| Animal/Source | Specimen | Specimen Type | Results |
|---|---|---|---|
| [redacted] | [redacted] | Feces | No parasite eggs detected |

## 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.

Note the detection of arsenic in the tested liver sample. The other detected liver mineral results are within acceptable or non-diagnostic ranges for this species.

ADDENDUM (3/12/19): Arsenic was not detected in the tested kidney sample.

**Heavy Metals Screen-CHRB**

| Animal/Source | Specimen | Specimen Type |
|---|---|---|
| [redacted] | [redacted] | Liver Tissue |

| Analyte | Result | Units | Rep. Limit | Units |
|---|---|---|---|---|
| Lead | Not Detected | ppm | 1 | ppm |
| Manganese | 1.9 | ppm | 0.1 | ppm |
| Iron | 150 | ppm | 1 | ppm |
| Mercury | Not Detected | ppm | 1 | ppm |
| Arsenic | 0.13 | ppm | 0.05 | ppm |
| Molybdenum | 0.67 | ppm | 0.4 | ppm |
| Zinc | 54 | ppm | 0.3 | ppm |
| Copper | 6.3 | ppm | 0.3 | ppm |
| Cadmium | 0.57 | ppm | 0.3 | ppm |
| Cobalt | 0.057 | ppm | 0.01 | ppm |
| Selenium | 0.56 | ppm | 0.02 | ppm |

| | | |
|---|---|---|
| [redacted] | [redacted] | Kidney Tissue |

| Analyte | Result | Units | Rep. Limit | Units |
|---|---|---|---|---|
| Lead | Not Detected | ppm | 1 | ppm |
| Manganese | 0.95 | ppm | 0.1 | ppm |
| Iron | 110 | ppm | 1 | ppm |
| Mercury | Not Detected | ppm | 1 | ppm |
| Arsenic | Not Detected | ppm | 0.05 | ppm |
| Molybdenum | Not Detected | ppm | 0.4 | ppm |
| Zinc | 27 | ppm | 0.3 | ppm |
| Copper | 8.6 | ppm | 0.3 | ppm |
| Cadmium | 7.5 | ppm | 0.3 | ppm |
| Cobalt | 0.03 | ppm | 0.01 | ppm |
| Selenium | 1.4 | ppm | 0.02 | ppm |