

Race Surfaces

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Haussler, Stover. Equine Vet J 1998;30:374-381 Stover. Current Tech, Equine Surg Lameness 1998:451-459 Stover and Murray. Vet Clin North Am:Eq 2008:21-36

	Tb
Musculoskeletal Injury	(%)
Fetlock Support Injuries sesamoid bone / suspensory lig	34
Metacarpal Fractures	19
Humeral Fracture	9
Carpal Fracture	7
Proximal Phalangeal Fracture	4
Metatarsal Fracture	4
Pelvic Fracture	3
Tibial Fracture	2
Vertebral Fracture	2
Scapular Fracture	2

Stover, Murray. VCNA:Eq 2008;24:21-36



Courtesy of Mitch Taylor







Anthenill, et al. Am J Vet Res 2010





Anthenill, et al. Am J Vet Res 2010







Catastrophic injuries occur when ...

...damaged bone is being actively repaired...



...normal conditions on compromised bones

Two Key Concepts

Mild injury

- high impact loads
- induce microdamage
- creates mild injury

<u>2-3+ weeks later</u>

- repair resorbs microdamage
- creates transient osteoporosis
- creates high fracture risk

Injuries are preventable !

5 - 18 times increased risk with detection of mild injury



Cohen, et al. JAVMA 2000 Cohen, et al. JAVMA 1997 Hill, Gardner, Carpenter, Stover. JAVMA 2001 Hill, Carpenter, Gardner, Stover. Am J Vet Res 2003

Multiple Factors are *associated* with Risk for Injury







Training intensity Horseshoe appliances Hoof conformation Race surface characteristics Medication

Race Track Considerations

- Mild injury that predisposed to catastrophic injury developed *before* the day of catastrophic injury
- Mild injury likely occurred because of high impact loads
- Race surface is one of several factors that affect magnitude of limb loads



















Goal: Develop Standard for Race Surface Behavior

- Minimize injuries
 - optimizing limb biomechanics
 - minimize need for skeletal re-adaptation by having a consistent surface behavior among racetracks
- Racetracks would implement the standard locally using climate specific surface materials

Develop Standard for Race Surface Behavior

- Recreate surfaces in the laboratory
- Characterize surface behavior
- Simulate various surface behaviors to determine the behavior that optimizes limb biomechanics (and thus reduces risk for injury)
- Study effects of different factors on surface behavior



- study surfaces in small scale
- study single factors and avoid confounding factors



Polytrack (about 7 inches) Porous Macadam (asphalt) (2 1/2 inches) Clean Stone (4 inches) Filter Fabric

Perforated Drainage Pipes

Track-in-a-box









Track-in-a-box and Track Testing Device







Repeated impacts without maintenance reduce compliance and increase peak loads





Harrowing increases compliance and decreases peak loads



Surface material affects compliance and peak loads



Maintenance affects different surfaces differently





Base material may affect surface behavior



Race surface effects on limb biomechanics







Breezing Speeds



Front and Hind Hooves







100 r







Goal: Develop race surface behavior standard



Messages

- 1. Injuries/fatalities adversely affect horses and the industry
- 2. Fatalities are due to pre-existing injuries
- 3. Fatalities can be prevented
- 4. Race surfaces matter
- 5. Race surface management matters







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