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Injuries to National Hunt racehorses

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Fractures are an important cause of loss of time in training and racing or career end in racehorses

Photo courtesy of the Racing Post

Highly prevalent during racing:

- Fractures= ~30% of musculoskeletal injuries in National Hunt (NH) races (Pinchbeck *et al*, Vet J 2004)
- 91% were fatal

High incidence during training:

- 1.5 per 100 horse months in training (Ely *et al.*, EVJ 2004)
- 20% were fatal

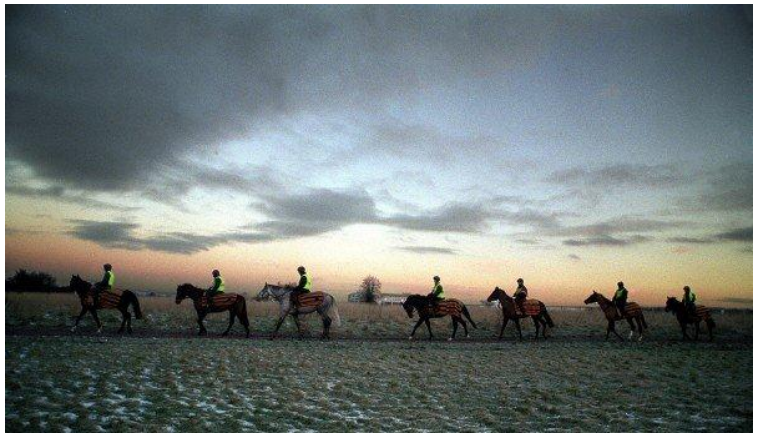
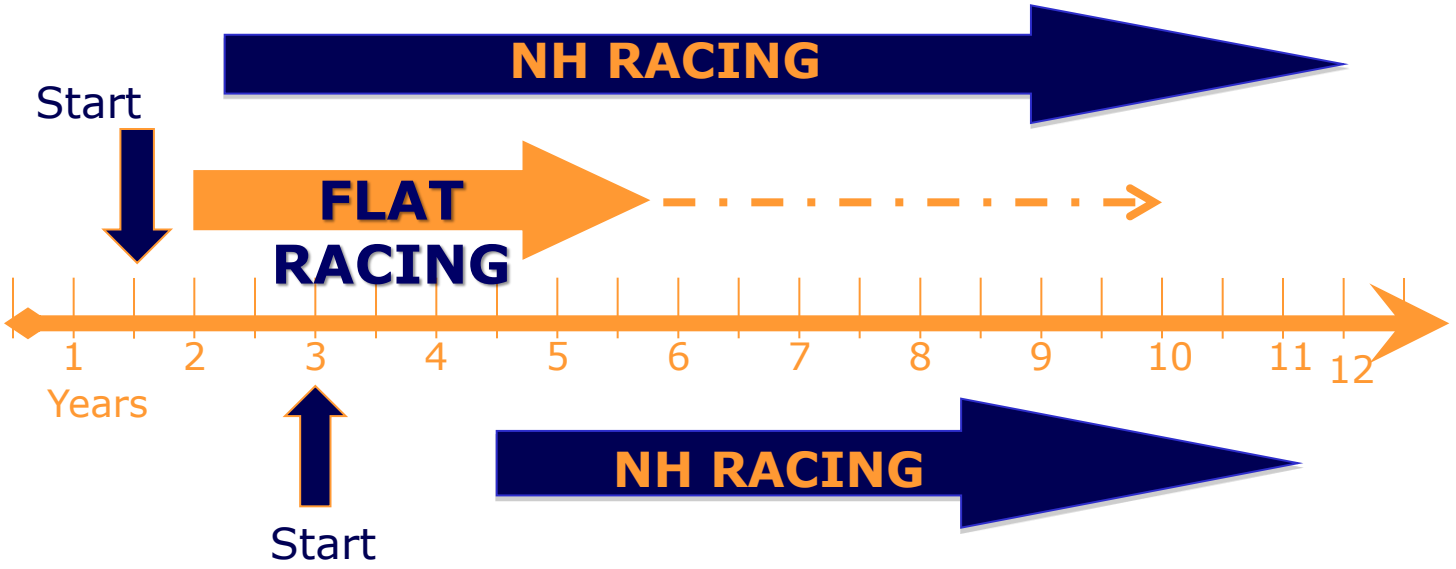


Photo courtesy of the Racing Post

Routes into National Hunt racing

EX-FLAT



EX-STORE

Hypothesis

Ex-flat racehorses will have fewer fractures than ex store horses

Why?

- Early exercise has beneficial effects on bone
    - Man (Kannus *et al*. Ann Intern Med 1995; Bass *et al.* J Bone Miner Res 1998)
    - Horses (Firth *et al.* EVJ Suppl 1999b; N Z Vet J 2005; Jackson *et al*. Am J Vet Res 2003)

- Older age at first race has been associated with higher risk of death in subsequent races (Wood *et al*., RSPCA report 2000)

Aims

- Estimate fracture incidence in NH horses in training
- Identify modifiable risk factors for fracture relating to the horse and its exercise regimen

Case definition

- Any fracture diagnosed via imaging or post mortem
- Catastrophic, clinically diagnosed injuries included
- Exclusions:
  - Osteochondral fragments <5mm
  - Fractures seemingly unrelated to exercise

Image of fractured tibia, courtesy of Rob Pilsworth

Fracture incidence

(Ely *et al*, EVJ 2009)

- 1,223 horses provided data on c.9,500 horse months at risk of fracture
- Total of 111 fractures, of which 38 (34%) were fatal
- 53 (48%) during training (13% of these fatal)
- 58 (52%) during racing (53% of these fatal)

	Incidence rate per 100 horse months	95% confidence interval
Overall	1.1	0.9, 1.3
Training	0.6	0.4, 0.7
Racing	27.6	19.8, 35.3

Detailed statistical analysis

81 cases and 405 controls, considering exercise in month before

- After accounting for trainer and exercise in the preceding 30 days, ex-store horses in the study sample appeared to be at twice the odds of fracture compared to ex-flat horses, but this difference was not statistically significant if applied across the whole population (95% CI = 0.9, 4.4; $P_{Wald} = 0.10$).

- For most (90%) horses
  - Risk increased with the distance cantered
  - And was highest in horses doing no galloping

Fracture conclusions

- Contrary to our hypothesis, horses that were previously in training for flat racing were not at *significantly* lower risk of fracture compared to ex-store horses

- Exercise distance associated with risk of fracture
  - Odds tend to increase with increasing exercise
  - Protective effect of some galloping in 30 days

- Trainer important risk factor
  - Factors other than exercise involved

Tendon injuries are an important cause of loss of time in training and racing or career end in racehorses

- Long recovery period
- High recurrence rate
- High incidence

RACECOURSE

TRAINING

Photo courtesy of Mirrorpix

46% of racecourse limb injuries
(Williams *et al*, EVJ 2001)

Incidence = 2.1 tendon and ligament injuries (TLIs) per 100 horse months

(Ely *et al*, EVJ 2004)

Photo courtesy of Mirrorpix

Hypothesis

Ex-flat racehorses will have more tendon and ligament injuries (TLI) than ex-store horses

Why?

- There is evidence that immature tendon can adapt to training (Kasashima *et al*. EVJ Suppl. 2002; Firth *et al*. N Z Vet J 2004)

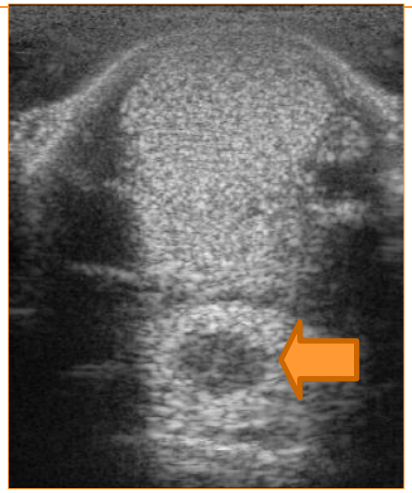
- Mature tendon has limited ability to repair and adapt to exercise (Smith *et al*. EVJ Suppl. 1999)

Aims

- Estimate TLI incidence in NH horses in training
- Identify modifiable risk factors for TLI relating to the horse and its exercise regimen

Case definition

- Any tendon or ligament injury diagnosed via imaging or post mortem
- Severe, unambiguous, clinically diagnosed injuries
- Traumatic, percutaneous lacerations excluded



The black area represents a recent injury in the suspensory ligament

A "bowed" superficial digital flexor tendon, the most common form of tendon injury in NH racehorses

Tendon Ligament Injury (TLI) incidence
(Ely *et al*, EVJ 2009)

- 1,223 horses provided data on c.9,500 horse months at risk of TLI
- Total of 205 TLIs, 7 (3%) of which were fatal
  - 182 (89%) superficial digital flexor tendon injuries and 23 (11%) suspensory ligament injuries
  - 85 (41%) during racing and 120 (59%) during training

	Incidence rate per 100 horse months	95% confidence interval
Overall	1.9	1.7, 2.2
Training	1.1	0.9, 1.3
Racing	48.2	38.0, 58.5

Tendon Ligament Injury incidence
(Ely *et al*, EVJ 2009)

Horse background was not associated with TLI

...either before or after adjusting for trainer and exercise distances in preceding 30 or 60 days

TLI incidence
(Ely *et al*, EVJ 2009)

TLI odds were significantly associated with:

- Increasing age (up to 8 or 9 years)
- Increasing race distance
  - In previous 1 or 2 months
- Trainer
  - odds significantly varied between trainers

But…

- Cumulative gallop distance and jump schooling days did **not** affect the odds of TLI

TLI Conclusions

- Contrary to hypothesis, horses previously in training for flat racing were **not** at higher risk of TLI compared to ex-store horses
- Exercise distance associated with risk of TLI
  - Odds tend to increase with increasing exercise distances
- TLI risk increases with age
- Trainer affects the risk of TLI

Summary conclusions from performance, fracture and tendon injury studies

- Exercise in 30 day-period:
  - More **cantering** increases race performance but is also associated with increased odds of fracture and TLI
  - Increasing accumulated **race distance** is associated with higher odds of winning a race but also increases odds of fracture and TLI
  - Some **galloping** is protective of fracture, does not affect TLI odds and increases odds of winning prize money

Scientist's summary

- We have studied injuries 1223 NH racehorses in 14 training yards in England.
- The rate of fracture was just over 1 case per 100 horses per month, even though the distances covered by these horses were around twice those in flat horses.
- Around 35% of these fractures were fatal.
- Risks of catastrophic injury were much higher for racing than training, with 55% of racing fractures resulting in death, compared to only 14% following fractures in training.
- Age did not affect the risk of fracture.

Scientist's summary

- The incidence of tendon injury was nearly twice that of fracture at 2 cases per 100 horses per month.
- Age was an important risk factor for tendon injury, with risk increasing with age, although the oldest horses in the study seemed to be at lower risk.
- Exercise intensity is an important risk factor for both fracture and tendon injury. Canter and high speed exercise (galloping and racing speed) need to be balanced to minimise risk of both injuries.

Scientist's summary

- Risk of fracture increased with exercise intensity in a similar manner to that in flat horses.
- The rates of fracture and tendon injury varied significantly between trainers, after adjusting for the different exercise intensity in the different yards.
- Some trainers were high risk for fracture and low risk for tendon breakdown and vice versa. The reasons for these differences are not clear.

Scientist's summary

- An important finding was that neither risk of fracture nor tendon injury was different in horses that had been NH stores compared to those that were previously in training for flat racing.
- Thus it does not appear that early training improves bone's fracture resistance nor does early training have potentially detrimental effects on tendon.
- As expected, ex-stores were significantly higher at the wither and had significantly larger cannon bone circumferences (but not lengths) than ex-flat horses, even though tendon cross-sectional areas were similar between the two groups.

Find out more about fractures and tendon and ligament injuries in racehorses

PD Clegg, Musculoskeletal disease and injury, now and in the future.

- Part 1: Fractures
  http://onlinelibrary.wiley.com/doi/10.1111/j.2042-3306.2011.00457.x/full

- Part 2: Tendon and ligament injuries
  http://onlinelibrary.wiley.com/doi/10.1111/j.2042-3306.2012.00563.x/full