Prevalence & Direction of Asymmetry in Polo Ponies

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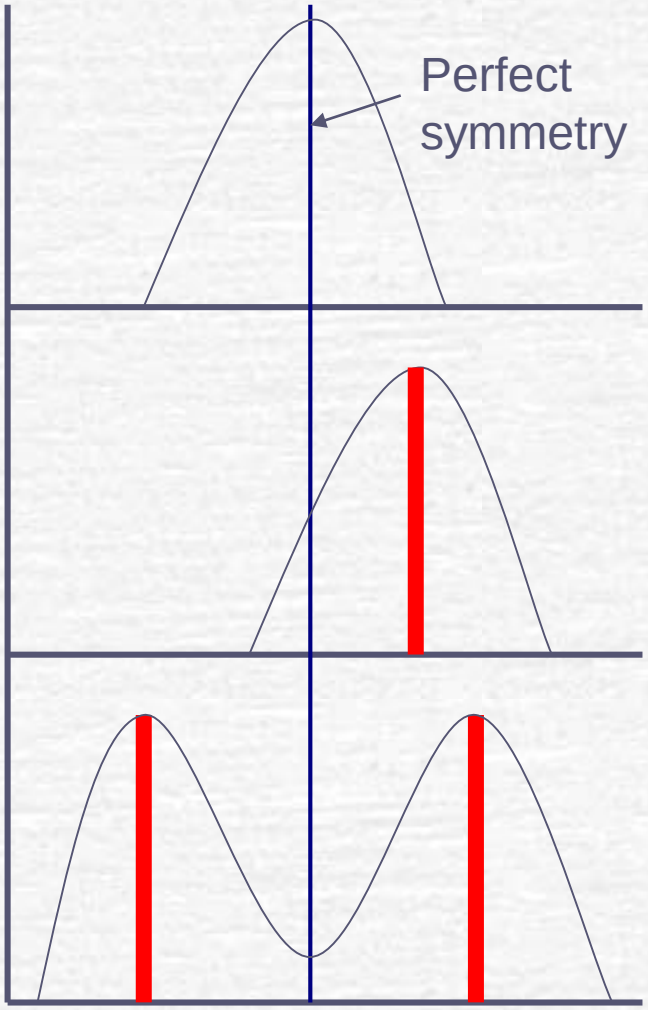
Introduction

- Optimal condition

Thornhill & Gangestad 1994

- Controlled by individual growth patterns
- Small *random* deviations
  - Fluctuating Asymmetry
  - Directional Asymmetry
  - Antisymmetry

Moller 1993; Manning *et al.* 1996



Introduction

- Manning and Ockenden (1994)
  - Racehorses with higher performance ratings demonstrated lower FA
  - 10 paired characteristics
  - Both functional and non-functional traits significant
- Manning and Pickup (1998)
  - Positive correlation between symmetry and athletic performance (speed) in male middle distance runners
  - Non-functional traits
  - Pinna length and nostril width strongly correlated

Introduction

- Watson et al (2003)
  - MCIII of 46 TB racehorses assessed radiographically
  - 76% of sample displayed longer right leg
  - Suggested to be related to training and selection pressures linked to track direction
- Davies and Watson (2005)
  - MCIII asymmetry and midshaft dimensions in 40 TB racehorses
  - Linear increase in dorsal thickness with increase in bone length
  - 60% of sample had thicker dorsal cortex in midshaft of right MCIII
- What about other disciplines?

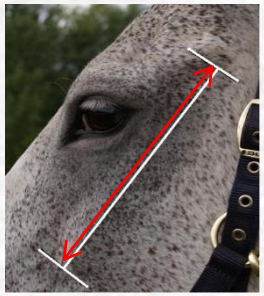
Aims

- To identify the whether a directional asymmetry was present in a group of low goal polo ponies.
- To identify which specific bilateral traits are most reflective of this asymmetry.

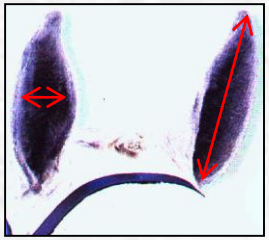
Methodology

- 30 Low Goal Polo ponies from 2 professional polo yards
- 13 bilateral traits measured
  - Eight functional traits and five non-functionaltraits
- Silverline® 300mm digital callipers (0.01mm accuracy)
  - Similar to the methodology used by Manning and Pickup (1994)
- Asymmetry = Li – Ri
  - Signed values indicate directional asymmentry
  - Resultant sign ignored when looking at degree of asymmetry from the ideal of zero
- Chi-square analysis
- T-test for independent samples
- Mann Whitney-U test

Methodology

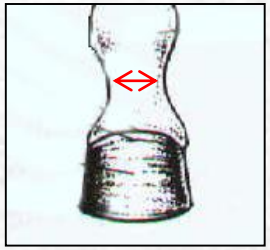


- Cheekbone length

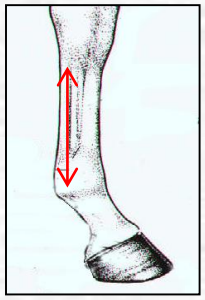


- Pinna length and width

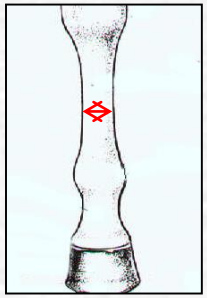
- Nostril length and width



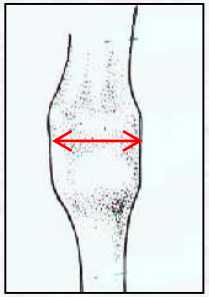
- Fore and hind proximal phalanx width



- MCIII and MTIII length



- MCIII and MTIII width

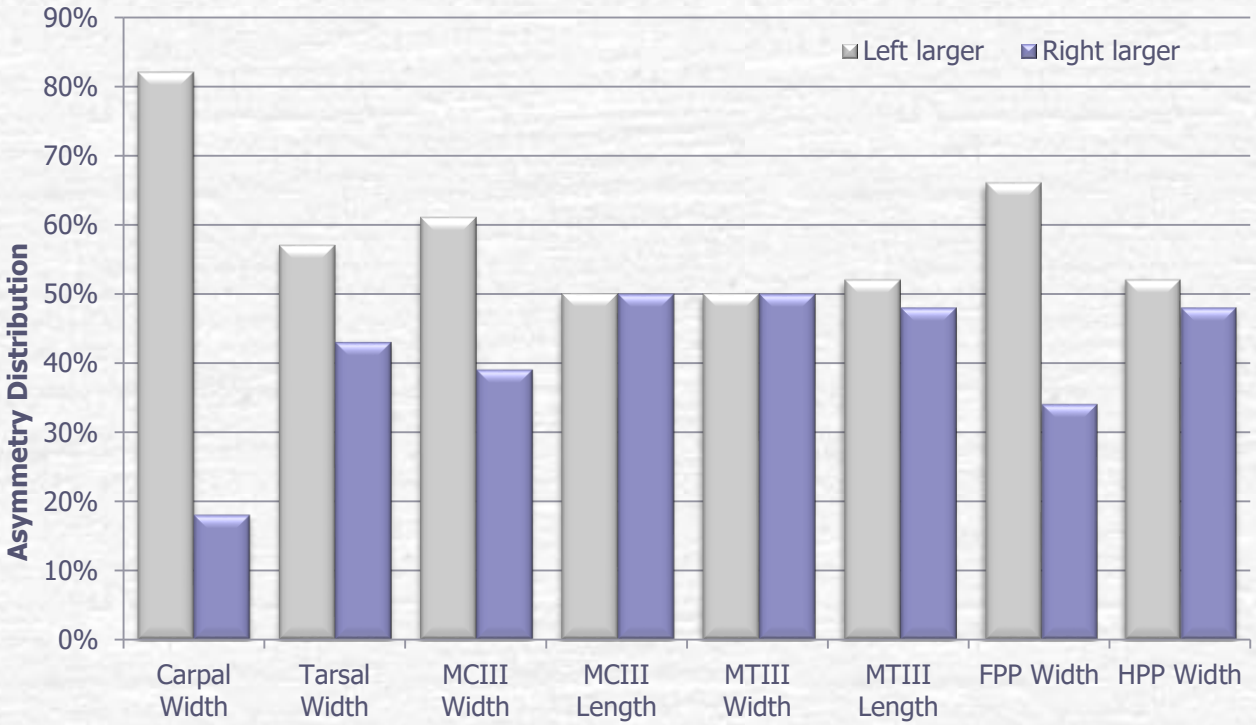


- Carpal and tarsal width

Directional asymmetry results: Facial traits

Asymmetry as a percentage of trait size	
Pinna width	3.29
Pinna length	1.61
Nostril width	10.26
Nostril length	5.35
Cheekbone length	1.32

Directional asymmetry results: Limb traits



Asymmetry as percentage of trait size	
Carpal width	4.74
Tarsal width	4.31
MCIII width	3.39
MCIII length	2.83
MTIII width	2.14
MTIII length	3.03
FPP width	3.94
HPP width	5.02

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Discussion

- Non-functional traits show greater range of asymmetry
- Asymmetry in functional traits not considered large enough to cause biomechanical alterations
- Reflective of internal disturbances?
- Phenotypic indicator of genotypic quality?
- Reflective of discipline specific demands?

Conclusion

- The results reinforce previous research findings indicating directional asymmetry in some bilateral traits.
- Methodology for data collection needs to become more standardised between studies to allow for a better comparison of findings.
- These findings could be used to identify potential performance ponies if found to be repeatable at high goal level
- Could be furthered to identify any association with injury prevalence