

Difference and relationship in length of the 'mean' canter stride of a horse and the intermediate strides within a two stride double fence combination

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Introduction

Show jumping is full of complex and technical questions to which horses must answer correctly to gain a clear round.

Horses during show jump courses are expected to tackle many variations of fence. Stachurska et al (2002) distinguished the types of fence potentially problematic for jumping horses. Within this study combination fences were noted as being difficult to tackle.

Hole et al (2002) looked in detail at the intermediate strides and jumping technique within a two stride double combination. The findings showed that the second intermediate stride was significantly shorter than the first intermediate stride (IM1 = 3.68m ± 0.38, IM2 = 2.30m ± 0.50) but were however conducted at the same velocity. The shorter stride length being achieved via the horse taking shorter steps within the stride.

The previous study was conducted using elite Olympic show jumping horses. The aim of this study is to show that non elite horse's intermediate strides between two stride double combinations may be different in length from popular belief and to identify if there is a relationship between the mean length of canter stride on the flat and the intermediate canter strides within a combination of fences.

Materials and method

A combination fence was set up 10m apart down the side of an indoor arena. The Sports Motion Gait Analysis camera was set up perpendicular to the combination allowing a clear recording of both fences.

Recordings via the Sports Motion Gait Analysis camera were taken of the horse's average canter. For purposes of mean results these recordings were taken two or three times. The horse and rider were then allowed to have a practice ride through the combination. Once ready the horse was recorded via the camera being ridden through the combination three times.

The video recordings were then uploaded on to the Sports Motion Gait Analysis system for analysis.



Figure 1. Photograph showing the set up of the combination fence for the trial.

Conclusion

In conclusion the technique used by elite show jumpers over a two stride double combination as shown by Hole et al (2002) was revealed to be that also used by non-elite horses in the same situation.

The canter stride used by a horse on the flat is considerably shorter than that used between fences, causing possible issues regarding novice built jumping exercises and the training of novice riders when learning to jump.

The fact that the technique used by both elite and non-elite horses is very similar if not identical in the foundation and reasoning behind its use means that although the type of fences jumped by each of the levels of horse is considerably different in height and width, the initial training and maintenance work of show jumping horses should take the same format.

Results

The results showed that there was a significant difference between the standard canter stride and the intermediate jumping strides (ANOVA, $P < 0.001$, mean standard canter = 3.05m, mean 1st intermediate jumping stride = 4.12m, mean 2nd intermediate jumping stride = 3.81m). It was also found that there was a significant difference between the two intermediate jumping strides ($P = 0.03$) with the second stride being shorter than the first (see Fig. 2).

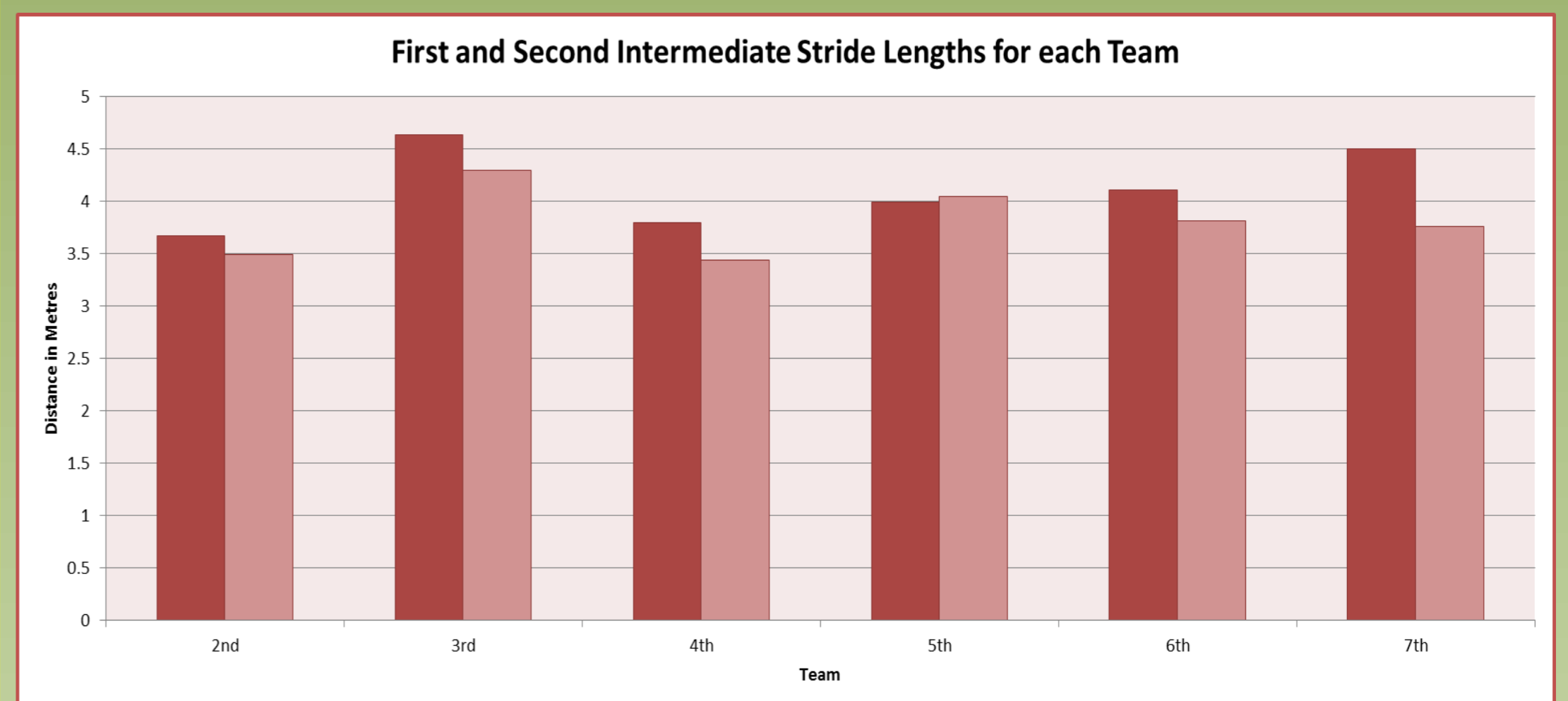


Figure 2. The first intermediate jumping stride was significantly longer than the second ($P = 0.03$).

Discussion

The canter stride is the basis for many equestrian jumping techniques, the length, velocity and frequency of the stride can determine the balance and overall momentum the horse can achieve to tackle fences (Powers and Harrison, 1999).

The length of the strides seen within the study (3.05m, 4.11m and 3.80m) show that the canter stride used by the horse on the flat is not suitable to be used by the horse whilst jumping.

The strides used between a combination of fences cannot be altered or 'learnt' by horses but simply if the canter strides approaching the combination is appropriate enough to set the ideal conditions for take-off (Powers and Harrison, 1999) at the first part of the double, the rest of the fence should come naturally to the horse.

The horses showed different intermediate stride lengths; however, all making up the set distance in the combination through landing and take-off stride changes. This suggests that the same adaptation occurs in elite and non-elite horses, which has possible implications for course design at all levels. (Hole et al, 2002).

References

- Hole, S.L, Clayton, H.M and Lanovaz, J.L. (2002) 'A Note on the Linear and Temporal Stride Kinematics of Olympic Show Jumping Horses Between Two Fences.' Applied Animal Behaviour Science, 75, 317-323.
- Powers, P.N.R and Harrison, A.J. (1999) 'Models for Biomechanical Analysis of Jumping Horses.' Journal of Equine Veterinary Science, 19(12), 799-806.
- Stachurska, A, Pieta, M and Nesteruk, E. (2002) 'Which Obstacles are Most Problematic for Jumping Horses?' Applied Animal Behaviour Science, 77, 197-207