

Conformation and its effect on laterality in the thoroughbred racehorse

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Introduction Within the UK race horses compete on tracks in both clockwise and anticlockwise directions. Desert Orchid was the first high profile racehorse who proved he preferred to run and jump in one direction, in his case the clockwise direction. A horse that expresses a preference to use one side more than the other is known as having motor bias. Motor bias horses can be classified as preferring a clockwise (C) or an anticlockwise (AC) direction. In humans there is a 93% bias towards preference of the right side, which would make the horse prefer a C direction (Corren and Porac 1977). However, there is ambiguous research as to whether the horse expresses motor bias at population level and in what direction. Deuel and Lawrence (1987) found that horses preferred the left lead leg in gallop whilst in contrast, Rachen-Schöneich and Schöneich (2007) and Williams and Norris (2007) both found that horses prefer the right leg during lateral exercise. If a racehorse prefers to use the right lead stride pattern it should perform better on clockwise tracks as the horse is forced to use the right lead stride pattern around C bends while a horse preferring a left lead stride pattern should prefer AC racetracks. Oliver and Langrish (1991) stated that if a horse has uneven hind limbs it can affect the speed the horse reaches around bends. Therefore measuring conformation points on the horse could help to identify one of the causes of laterality in the racehorse, which could lead to more successful horses and increased safety within the sport.

Materials and methods Conformation data (Fore limb length, hind limb length, shoulder length, shoulder angle and shoulder to hip length) was recorded on both sides of National Hunt racehorses in Southern England, n=57 (males= 51 females n=6). There were two ways that horses qualified for this study. The first was if they were part of the British Horseracing Authority's database 'why horse's run badly' which included steward's notes on motor bias, the database is available at www.britishhorseracing.com. The second point of qualification was if the horse expresses a strong desire to race in one direction, for example if the horse had only won races on clockwise tracks.

For analysis the data was divided into two sets; horses that prefer clockwise tracks and those that prefer anticlockwise tracks (AC bias n=26, C bias n=25). A one-way anova test was performed on both sets of data in PASW statistics version 18 (formerly SPSS statistics). The anova test was used to analyse the data taken from the two sides (right and left) of the horse.

Results On both the C and the AC horses the left side was notably ($P<0.05$) longer than right when the shoulder to hip length was recorded. In the C horses the shoulder length was significantly longer on the right ($P<0.05$) while the shoulder length was significantly longer on the left in the AC horses. There were considerable differences in fore limb length on both the AC and C horses ($P<0.05$) with the left leg being longer in the AC horses and the right leg being longer on the C horses. However, the AC horses were the only group to show a significant difference in hind limb length ($P<0.05$) with the left leg being extensively longer than the right. In the C horses there was a significance difference in shoulder angle with the left side being steeper but there were no differences seen in the AC in regards to shoulder angle.

Conclusion The results indicate that a longer left shoulder means the horse is likely to be classified as AC while a longer right shoulder means the horse is significantly more likely to prefer the C direction and the same can be said for fore limb length. Therefore shoulder length and fore limb length could be a strong indicators of laterality and they could be measured and used to sculpture the horse's training plan to its individual needs. The results from this study back up the suggestions of Rachen-Schöneich and Schöneich (2007) that stated that crooked conformation can affect the way of going and the stride pattern a horse prefers to use. Further work is needed to pinpoint further effects on racehorse laterality and whether additional conformation points can indicator a horse's laterality.

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