COMPARISON OF DRESSAGE RIDER POSTURE WHEN MOUNTED ON DIFFERENT HORSES

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INTRODUCTION

The equine sport of Dressage subjectively judges how well a horse and rider move together. Dressage experts believe that a horse cannot move at its potential without the optimal level of balance and communication with the rider.

Measurable differences can be observed in the kinematics of multiple horses when ridden by a professional vs. amateur rider [2]. The availability of measurable horse-rider interactions would further benefit Dressage training, instruction and judging. Therefore, the purpose of this study was to compare rider posture with two horses, and to assess the resulting effect on the horses.

METHODS

Two well-conditioned Dressage horses, accustomed to the arena in which data collection occurred, were fitted with identical 17.5-inch Dressage saddles and their usual Dressage bridles. Ten adult amateur Dressage riders rode both horses. All riders had at least 4 years of riding experience and 50 hours of formal Dressage education. Two calibrated pan and tilt cameras were positioned 15 meters apart to gather position-time data as the horses trotted along a 12-meter track.

Reflective markers were placed on the following landmarks of each rider: top of the head, jaw, shoulder, hip, knee and ankle. Markers were also placed over palpable skeletal regions along the horses' right hind limbs to aid in later identification of joint angles. Each rider was given a 5-minute warm-up period with the horse. Five consecutive trials of each horse-rider combination were filmed. All pairs were filmed within a five-hour period, and their order was randomized.

Using Peak Motus® Pan and Tilt Software, one stride cycle, beginning with the right hind limb in perpendicular stance phase, from each trial was captured and digitized. The average stifle-, hock-, hip- and knee- angle ranges were calculated to assess horse movement and rider posture. Figure 1 illustrates the angles of interest from which comparisons were made.

RESULTS AND DISCUSSION

Table 1 described the average angular ranges of riders and horses. Separate paired t-tests ($\alpha = 0.05$) were used to compare the rider hip and knee angle ranges while riding two different horses. The hip angle ranges changed significantly ($t_9 = 2.50$, $p = 0.0337$), while the knee angle ranges remained similar between horses ($t_9 = 0.064$, $p = 0.95$). Paired comparisons of horse angular ranges revealed significant differences for both the stifle and hock ($t_9 = 11.10$ and 6.78, respectively; $p < 0.0001$). These results suggest that riders change their movement, adjusting to the movement and potential aptitude of the horse in relationship to the skill involved (trotting action in this case).

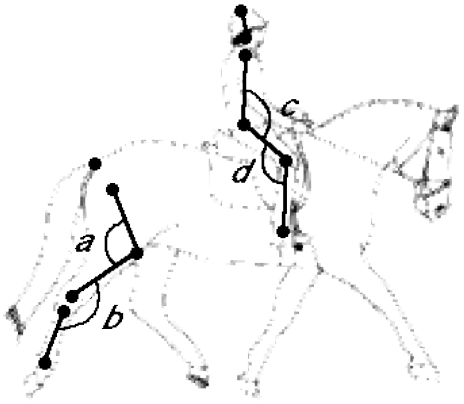

Figure 1: Outline of horse and rider shown for orientation purposes. Horse and rider marker placement and joint angles (*a* = stifle, *b* = hock, *c* = hip and *d* = knee).

CONCLUSIONS

Dressage, a sport based on qualitative observations, would benefit from quantitatively defining desirable interaction characteristics. In analyzing joint angles of ten riders on two horses, we found that a rider's hip kinematics vary when riding horses whose movement patterns are different. Thus, when teaching and judging a pair, the rider position must be flexible depending upon the horse' gaits.

REFERENCES

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2. Peham, C. et al. (2001). *Sports Eng.,* **4**, 95-101.

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Table 1: Descriptive angular values (Mean ± SD)

Joint Angle Ranges (deg)	Stifle (a)	Hock (b)	Hip (c)	Knee (d)
Horse A	28.7 ± 1.7	46.7 ± 1.4	11.1 ± 2.7	13.8 ± 2.2
Horse B	41.7 ± 2.2	52.9 ± 2.8	14.2 ± 5.3	13.7 ± 6.1