Functional differences between riders and non-riders

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Introduction

Dressage is an Olympic equestrian sport where horse-rider combinations perform a predetermined test composed of different gaits or patterns and is the ultimate expression of horse training and elegance (Clayton & Hobbs, 2019). The intense connection between both human and equine athletes is a thing of beauty to behold and is often compared to ballet (FEI, 2019). Specific movement patterns can be found in experienced dressage riders (Alexander et al., 2015; Munz et al., 2014). Athletes across a range of sports have specific qualities that make them better than others at their specific sport. For some sports this may be balance, aerobic capacity, or agility. For dressage riding, this appears to be harmony between the rider and the horse (Munz et al., 2014), which involves movement of the pelvis to follow the horse whilst maintaining postural control of the trunk.

Maintenance of an upright posture in the face of perturbations and minimising postural sway requires coordinated activation of the trunk musculature (Horak et al., 1990; Larson & Brown, 2018). Deficiencies in the activation or recruitment patterns of the trunk musculature, along with fatigue, is proposed to produce pronounced effects on postural control across multiple joints including the spine, shoulder, knee and ankle (Johanson et al., 2011; Larson & Brown, 2018; Lin et al., 2009). This may be because of muscular fatigue on the efficiency of motor recruitment, accuracy of sensory information and the integration of peripheral afferents with the central nervous system (Gandevia, 2001; Taimela et al., 1999).

There may be some easily measurably differences between riders and non-riders that can be identified from simple, validated tests that evaluate trunk motion and control, such as the trunk impairment scale (TIS).

Aim

To investigate differences in sitting function and trunk range of motion in riders and non-riders.

Methods

Participants were staff and students from the University of Central Lancashire and Myerscough College who either participated in riding (riders, n=12) or other sports (non-riders, n=8).

Table 1: Demographic information of riders and non-riders

	Non-Rider	**Rider**
Height (cm)	171.7 (9.3)	166.7 (8.9)
Mass (kg)	69.8 (10.5)	73.2 (19.5)
Age (years)	25.4 (8.9)	20.7 (4.4)

Participants were assessed in sitting by JPD. ROM in flexion-extension, lateral bending and axial rotation were measured whilst sitting on a plinth using a goniometer. Following this, the trunk impairment scale (TIS) test was administered. ROM and TIS scores for each item were tabulated in Excel. Independent samples t-tests were used to evaluate whether there were significant differences ($p<0.05$) in measurements and TIS overall score between groups in SPSS.

Results

Results from ROM in sitting measurements separated by group are shown in Figure 1. Significant differences between groups were found in lateral flexion to the left ($p=0.009$) and axial rotation (left, $p=0.005$; right, $p=0.006$).

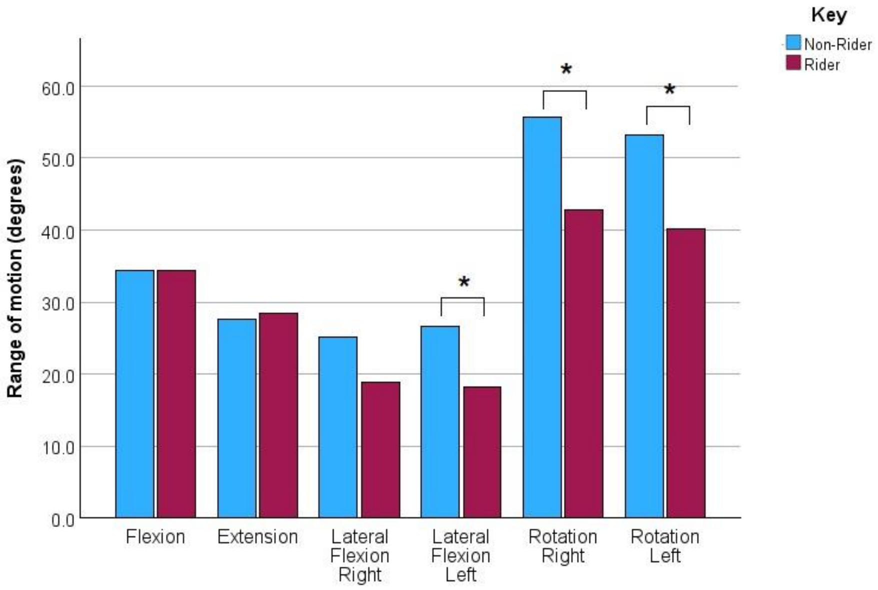

Figure 1: Average trunk ROM (degrees) between riders and non-riders

No significant differences ($p>0.05$) were found for overall TIS score between groups. For both groups, most participants (8 riders, 5 non-riders) scored less than 23, which related to lower scores for upper and lower trunk dynamic symmetry items. Results of TIS scores are shown in Figure 2.

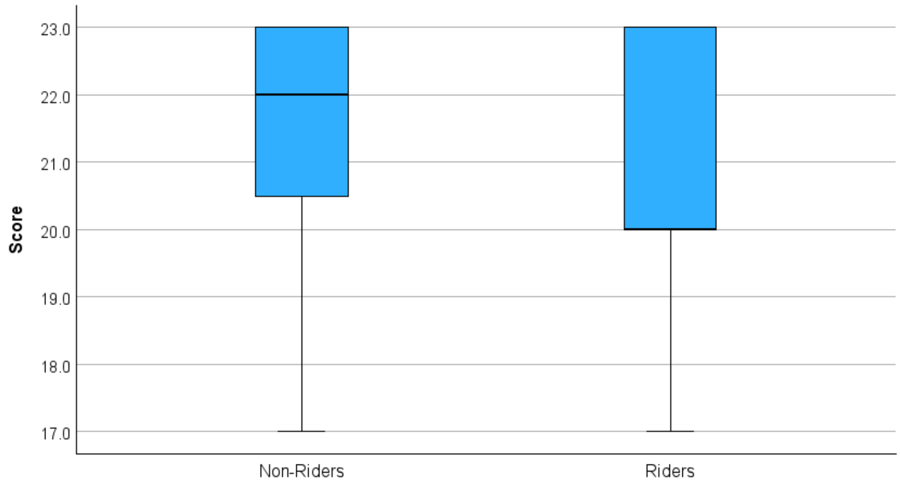

Figure 2: Trunk Impairment Scale (TIS) scores for riders and non-riders

Conclusion

The results of this study found that riders had reduced flexibility in lateral bending to the left and axial rotation compared to non-riders. This may relate to a sport specific demand of riding, where greater core strength developed to maintain trunk posture during riding has impacted on trunk flexibility. Interestingly, all but one rider was right-hand dominant, so there may also be an influence of laterality. As the sample size of each group was relatively small, further work is needed to establish whether this is typical of the rider population.

As the participant group were all able-bodied and injury free it was expected that a score of 23 would have been achieved by most participants in both groups. Most participants were able to rotate their upper trunk symmetrically, however the majority were either unable to rotate their lower trunk as described or were unable to rotate it symmetrically. Further work is needed to establish whether riding discipline, skill and training influence this score.

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