A theoretical model of causal factors associated with functional asymmetry in equestrian sports

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The symmetrical structure of both the human and equine body is designed for efficient load distribution during functional activity. Efficient execution of riding movement relies upon maintenance of balance and posture during dynamic interaction. Anatomic asymmetry alters the distribution and magnitude of mechanical stress upon the body of the horse and rider. Motor control is subject to lateral bias and any conditioning that reinforces bias increases exposure to asymmetric stress.

Imperfect torsions, created by asymmetry of motion segments and muscles, can manifest as scoliosis deformities (Asher & Burton, 1999). Increased unilateral torque forces have been suggested as causal factors in the higher incidence of functional scoliosis found in athletes (Omey, Micheli, & Gerbino, 2000). A number of studies have reported that a combination of high training volume and mal-alignment is indicated as an anatomic risk factor for overuse injury (Ahonen 2008, Fousekis et al. 2010, Krivickas 1997).

Asymmetric musculo-skeletal development is attributed to the influence of genetic inheritance, limb dominance and environmental stimuli. Turner (2011) refers to the problems of quantifying the contribution of asymmetric intrinsic and extrinsic factors, and emphasises the need for reliable assessment of anatomic asymmetry and consideration of the implications of sport-specific functional asymmetries.

Whilst riding, it is important that the movements of the rider's hips, pelvis and torso allow them to maintain stable phase synchrony between their own body and that of the horse. An asymmetrical posture can have a significant effect on balance and stability, impeding performance and increasing the risk of injury to both horse and rider (Nevison & Timmis, 2013).

This poster proposes a theoretical model of the intrinsic and extrinsic factors which contribute to asymmetrical musculo-skeletal loading, resulting in functional asymmetries which may reduce in performance and increased the risk of injury to both horse and rider.

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