HOW TRAINING AIDS AFFECT BACK KINEMATICS AND MUSCULAR ACTIVITY?

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Take Home Message

Choice of training aid is important during training and rehabilitation of the equine; it should be made based on clinical reasoning following a thorough assessment of the equine's locomotion by a qualified professional.

Introduction

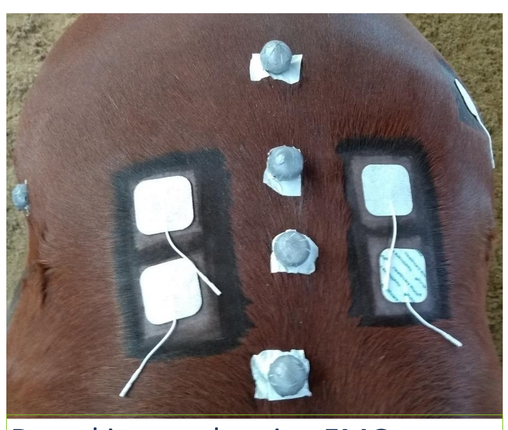
Training aids are commonly used to improve performance and are often prescribed to owners during the rehabilitation of spinal dysfunction and colic surgery (Walker *et al*., 2013). Despite widespread use of training aids, scientific evidence regarding their effects on equine kinematics and kinetics is limited, particularly regarding the effects on muscle activity. The aim of this research was to investigate the immediate effects of the EquiAmi, Pessoa and Equiband on equine spinal and limb kinematics and muscle activity of *m. longissimus dorsi* in the trotting horse.

Methods

- Eight clinically sound horses with mean ± s.d. age of 13 ± 6.72 years and wither height of 152.9 ± 5.81cm from Writtle University College were used in this study.
- Seventeen 30mm reflective markers and Quintic Biomechanics v. 29 software were used to collect spinal and limb joint angles and stride length.
- A Neurotrac Myoplus 2 Pro electromyographic system was used to analyse average and peak muscle activity of *m. longissimus dorsi*.
- Following a standardised warm-up, horses were recorded trotting on a straight line in a randomised order wearing each training aid and during a control condition in which no training aid was applied.
- The training aids were applied following manufacturers guidelines; the EquiAmi and Pessoa on the lowest setting with the nose fixed just in front of the vertical and the Equiband abdominal and hindquarter resistance bands were applied at 30% tension.
- Data were statistically analysed in IBM SPSS v. 22 for significance.

Experimental set up of each training aid. a = Equiband, b = Pessoa, c = EquiAmi.

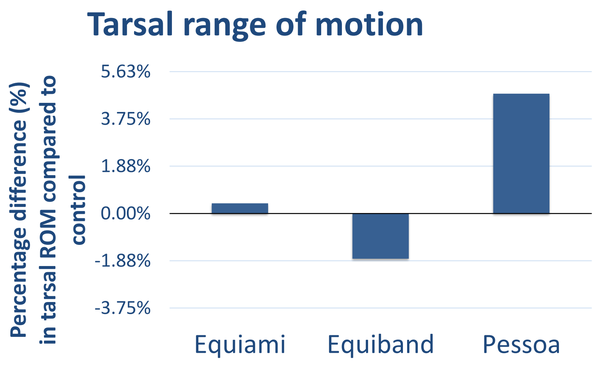
Quintic camera and a horse wearing the Pessoa training aid

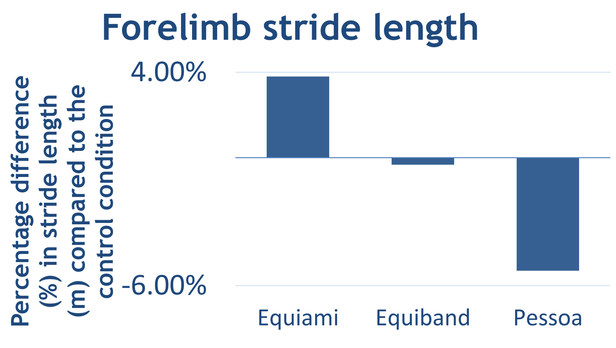


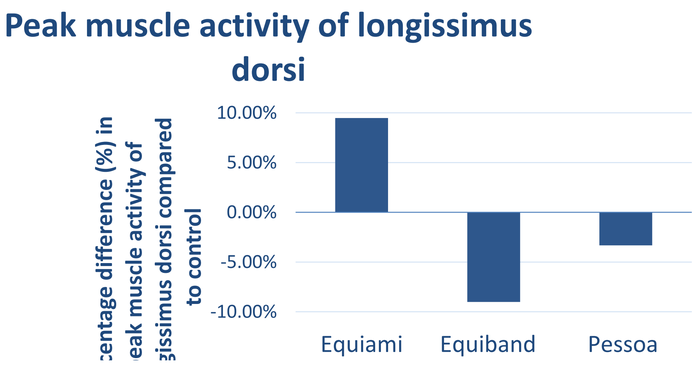
Dorsal image showing EMG electrode placement.

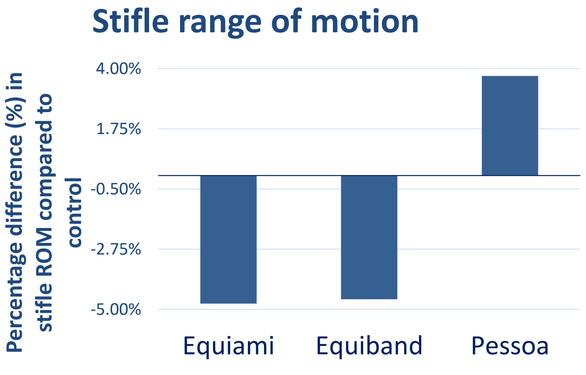
Results

Results suggest that the Pessoa is effective at increasing hindlimb range of motion, useful for training dressage horses or for those with restricted tarsal motion. However, the Pessoa may negatively impact the forelimbs, as forelimb stride length decreased by 11 cm. It is possible that the tension in the hindquarter band of the Equiband restricts hindlimb retraction and thus joint range of motion, since it decreased hindlimb stride length by five centimetres. The Equiband reduced peak activity of *m. longissimus dorsi* the most; linking this with increased maximal lumbosacral flexion angle found with the Equiband, it may be proposed that *m. longissimus dorsi* relaxes, with simultaneous contraction of the abdominal muscles using this training aid, although this requires investigation. Increased muscle activity with the EquiAmi links with increased extension of the lumbosacral joint found with this training aid, suggesting the EquiAmi is not useful in promoting the horse to stretch and relax over the topline. However, the EquiAmi increased forelimb stride length by eight centimetres, as reported in earlier research (Sanbrook, 2013), providing evidence for its use on horses with restricted forelimb stride length.









Conclusion

The three training aids used have different effects on equine locomotion, highlighting the importance of selecting the most effective training aid to target the horse's requirements. Using a combination of training aids may be necessary within a horse's training or rehabilitation programme. Using these training aids on the lower setting may be implemented into early rehabilitation with little detrimental effects on the forelimbs and vertebral column. However, to improve hindlimb engagement and ROM, a more advanced setting may be required, for which further work is required.

References

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