

Effect of vortex wave circulation stimulation on muscle thickness in mature horses on stall rest

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Industry use of vibration stimulation by horse owners as a therapeutic option for equine athletes is growing in popularity. The commercially available TheraPlate<sup>®</sup> uses vortex wave circulation (VWC) which delivers pulsatile stimulation from 2 separate plates (front and hind) thus administering equal exposure to all 4 limbs of the horse. To date, a paucity of research has investigated the effect of vibration stimulation on muscle thickness (MT) in horses. Therefore, the objective of this study was to determine if VWC is advantageous to mature, stock-type horses (N = 8) subjected to stall rest by measuring changes in MT in response to exposure to VWC. All horses were moderately exercised for 1 hr/d, 4 d/wk for 45 d prior to being stall rested. Horses had *ad libitum* access to water and were housed on native grass pasture during the exercise period. Horses were then blocked by age (4 - 14 yr; mean  $\pm$  SE;  $9.00 \pm 1.32$ ) and assigned to 1 of 2 groups (control, CON; n = 4 or treatment, TRT; n = 4), and placed on stall rest for 8 wk. Treatment horses were exposed to 15 min of VWC 2x/d (0700 and 1800), 5 d/wk (50% max; ~2,100 RPM), whereas CON were not. During the stalling period, all horses were fed 2% BW in hay/d. On d 0 (beginning of stall rest) and every 2 wk thereafter, the thickness of the *extensor carpi radialis*, *extensor digitorum longus*, *gluteus medius*, *longissimus lumborum*, *semitendinosus*, *supraspinatus*, and *longissimus thoracis* muscles were measured via ultrasonography. Muscle thickness was used to calculate the % change relatively compared with d 0. A generalized linear mixed model was used to analyze MT data in the GLIMMIX procedure of SAS 9.4 (SAS Institutes, Cary, NC) with significance declared at  $P \leq 0.100$ . Muscle thickness of the *longissimus thoracis* in TRT horses was increased by 8.9% ( $P = 0.008$ ), which was significantly greater ( $P = 0.020$ ) than 8.4% decrease in MT ( $P = 0.010$ ) in CON. Additionally, MT of the *longissimus lumborum* in TRT horses increased by 7.7% ( $P < 0.001$ ) which was significantly greater ( $P = 0.068$ ) than the 2.9% increase in MT ( $P = 0.011$ ) in CON. The thickness of the *extensor carpi radialis* in TRT horses was also increased by 30.9% ( $P = 0.005$ ) which was significantly greater ( $P = 0.096$ ) than the lack of change in CON horses (-0.40%;  $P = 0.945$ ). Both the *longissimus thoracis* and *longissimus lumborum* muscles are supporting muscles in the thoracic and lumbar regions, which are greatly relied upon by the equine athlete. Therefore, VWC appears to be a viable option for minimizing, if not improving, muscle loss in stock-type horses during stall rest.