

Quantitative gait analysis with Alogo Move System in jumping horses trained for 10 weeks using the water treadmill

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Objectives: The aim of this research was to study the effects of a WT training program on selected jumping parameters of horses.

Material and Methods: Six trained horses, ~16 years-old, ~578 kg, were evaluated before (M1) and after (M2) a training protocol that included the WT (20min, twice/week, water height at the carpus) to a well-known sequence of exercises for 10 weeks. Animals served as their own control as they have been performing those exercises for more than 6 months. On both occasions, the horses' kinematics were evaluated through a show jumping field test (JFT) while wearing a triaxial accelerometer with GPS-based inertial measurement unit (Alogo Move ProTM) attached mid-ventrally to the girth. Data was collected and processed using the Alogo software, interpreting separately vertical and oxer jumps. At both evaluations, we determined the angles between the ground and the highest point of the withers and croup during the take-off (α), striking power of the hindlimb at the take-off (G), trunk vertical displacement (cm), jump duration (ms) and speed (km/h). Also, during water training IMU system measured trunk displacement (cm) at walk and trot, with water, at weeks 4 and 9. Data was analyzed using paired t-test ($p < 0.05$).

Results: After the WT training (M1 vs. M2), significant higher values were recorded for strike power (~2.5G vs. ~3.2G) and take-off angle for the simple jumps (~20.0° vs. ~24.5°) and for take-off angle for the oxer jumps (~21.7° vs. ~26.1°). No significant changes were observed related to trunk displacement in both JFT as well as in water training.

Conclusions: Horses showed improvements in forehead elevation and strike power at take-off at show jumping field after 10 weeks of WT training that contribute to jumping success.

Keywords: biomechanics; kinematic; training.

The study was approved by the Institutional Ethics Committee (CEBEA-FMV, 28/2023 and 17/2025).

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