

Assessment of 1-month Conditioning Program Practised by Equine Establishment in Conditioning Endurance Horses

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Abstract

Fitness indicators in horses are physiological variables such as V_{140} , V_{200} , V_{LA2} and V_{LA4} . Endurance conditioning increases fitness level of horses. Fitness levels of 16 endurance horses from 3 different establishments practicing a similar conditioning regime were evaluated after a 1-month of conditioning. A standardized exercise test was carried out for all horses prior and after conditioning. Heart rates were monitored and blood samples were obtained throughout the exercise test and blood samples were then analyzed for lactate, cortisol, and muscle enzymes. Paired sample T-tests between pre and post conditioning were performed to evaluate the effects of 1-month conditioning program on these physiological variables. Results showed that there were no improvement in V_{140} , V_{200} , V_{LA2} and V_{LA4} after a 1-month conditioning program, however exercise velocity in Run 1 and AST in Run 2 were significantly different. Therefore, it was concluded that the 1-month conditioning program practiced was insufficient to increase the fitness levels of horses due to its short period and ineffective conditioning program.

Keywords: endurance horses, standardized exercise test, fitness indicators

Introduction

Equine exercise physiology is defined as the study of equine's body system to adjust, adapt and respond to exercise (Marlin, et al., 2002). Principles of endurance conditioning program consist of long slow distance (LSD) conditioning to build up the aerobic capacity, strength conditioning consisting of low velocity but high intensity exercise nearly anaerobic threshold such as hill work to improve both aerobic and anaerobic capacities, and fartlek or interval conditioning as recommended in fast exercise conditioning (Ridgeway, 1994) to reduce muscular injuries and less stress to horses due to continuous exercise of long distance.

This study was conducted to compare fitness level of endurance horses after a 1-month conditioning program and to evaluate the conditioning program by comparing the responses of exercise velocity, heart rate, blood lactate, cortisol and muscle enzymes of endurance horses.

Materials and Methods

Animals

Sixteen clinically healthy horses were used in this trial. Horses were from three different establishments practicing a similar conditioning program.

Standardized Exercise Test

Standardized Exercise Test (SET) was conducted using a 500-m flat straight track consisting of four incremental exercise velocities. Heart rate was continuously recorded during SET by a POLAR Equine S610i heart rate monitor. Blood samples were obtained through jugular venipuncture, then centrifuged and analyzed for lactate, cortisol and muscle enzymes. Fitness parameters of heart rate (V_{140} , V_{200}) and lactate (V_{LA2} , V_{LA4}) were determined by a graph of heart rate and lactate over velocity.

Statistical Analysis

Paired sample T-test was used to compare velocity, heart rate, lactate, cortisol, muscle enzymes and fitness parameters prior and after 1-month conditioning.

Results and Discussion

Velocity

There was only significant difference at Run 1 during SET, where the mean post-conditioning value (6.37 ± 0.82 m/s) was significantly higher than the pre-conditioning value (5.77 ± 0.94 m/s); however there were high mean values in post-conditioning observed. This was due to physiological adaptations, leading to a decrease in cortisol secretion due to a decrease in responsiveness to adrenal cortex (Marc, et al., 2000) and improvement of gait velocity, thus resulting in larger step.

Heart Rate

There was no significant difference in heart rate, however the mean values of post-conditioning were observed to be lower at rest (36 ± 6 bpm), Run 1 (130 ± 15 bpm) and recovery (50 ± 6 bpm). Rapid recovery heart rate is a good indicator of fitness in endurance horses (Marlin, et al., 2002); however the conditioning program was insufficient to produce significant difference

Lactate

Mean value of lactate was higher in post-conditioning (8.73 ± 5.51 mmol/L) compared to pre-conditioning (6.46 ± 4.27 mmol/L). Furthermore there was a significant difference during recovery. This is due to positive correlation of lactate to velocity, resulting in increased post-conditioning lactate values.

Cortisol

There was no significant difference in cortisol level, however a trend of lower mean values in post-conditioning was observed during SET. Cortisol showed similar trends as heart rate and lactate, where it was found to be positively correlated with velocity (Masahiko et al., 1998).

Muscle Enzymes

There was significant difference observed in Run 2, where pre-conditioning AST value (333.7 ± 89.1 U/L) was higher than post-conditioning AST value (286.4 ± 37.3 U/L). CK showed a similar pattern as lactate, with the only significant difference observed was during recovery phase. It seemed that the conditioning program practiced was formulated with strenuous conditioning and insufficient duration to improve aerobic capacity.

Fitness Parameters

There was no significant difference among the four fitness parameters; furthermore the mean values of these parameters were lower in post-conditioning compared to pre-conditioning.

Conclusion

It is concluded that conditioning program practiced by these equine establishments was insufficient and ineffective to improve fitness levels of endurance horses.

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