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Energy expenditure and distance travelled by polocrosse horses during competition

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Background – Polocrosse is an equine sport developed in Australia that combines aspects of polo and lacrosse. It is a game of four periods (chukkas) of approximately 8 minutes each. A team consists of two groups of three horses, which play in either chukkas 1 and 3, or 2 and 4. Horses play in Position 1 (attack), Position 2 (centre) or Position 3 (defence). The game imposes constantly changing exercise intensities but these have not been measured.

Objectives – The objectives of this study were to use heart rate responses to quantify energy expenditure of horses during a polocrosse game and to calculate the distance travelled and velocities reached.

Methodology – Measurements of heart rate, velocity and distance travelled were made during competitive polocrosse games with six polocrosse horses. Data were recorded for two chukkas and the intervening recovery period, using an integrated heart rate monitor and global positioning system (E-TRAKKA; Equitronics Pty Ltd., Perth). Energy expenditure was calculated from a relationship between heart rate and Vo_2 (Coenen 2005).

Outcome – During play, the maximum heart rate recorded was 224 bpm (sustained for 6 sec.); mean heart rates varied from 119 to 150 bpm. There was no difference in mean heart rate between the 2 chukkas played by each horse. The horses in this study used an average of 0.55 ± 0.124 MJ NE/min. (mean \pm SE), with one horse using 22 MJ NE in a game of two chukkas and the intervening recovery period (overall mean 5.3 ± 2.70 MJ). Energy expenditure was similar in the first (0.8 MJ NE/min.) and the second (0.7 MJ NE/min.) chukka played. Horses playing in Position 1 tended to have higher ($P < 0.1$) rates of energy expenditure (0.63 MJ NE/min) than horses playing in Position 2 (0.48 MJ/min.) or Position 3 (0.54 MJ/min.). The total distances recorded were 5.3 ± 1.3 , 4.8 ± 1.1 and 4.1 ± 1.2 km for horses in positions 1, 2 and 3 respectively. Multiple regression analysis for velocity showed that higher average velocities were achieved by horses playing in position 1 with a maximum speed of over 42 km/hr.

Conclusion – Polocrosse imposes considerable energy demands on the horse and horses playing in position 1 exercise with the greatest intensity and travel the greatest distance.

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Relationship between fruit and vegetable intake and antioxidant capacity

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Background – Despite fruit and vegetables constituting a major part of any healthy diet, there are currently no objective measures of intake. Individual antioxidants, such as β -carotene, have been linked with fruit and vegetable intake; however the analysis is difficult and time consuming and may not account for a varied diet. Total antioxidant capacity is a measure of the cumulative reducing power of a given sample and has been previously studied in serum and plant matter and may be a potential objective measure for fruit and vegetable intake.

Objective – To determine the extent to which total antioxidant capacity is an indicator of fruit and vegetable intake.

Design – Cross-sectional study of 40 adults (30 male, 10 female), mean age 57.4 ± 11.7 y (\pm SD), mean BMI 28.8 ± 3.3 kg/m²; servings of fruit and vegetables determined using a food frequency questionnaire and were correlated with serum total antioxidant capacity measured by the Ferric Reducing Antioxidant Power Assay.

Outcomes – The mean total antioxidant capacity was 528 ± 119 μ mol/L (range: 255-735). Serum total antioxidant capacity was not found to have a statistically significant correlation with fruit ($r = -0.08$), vegetable ($r = -0.25$), fruit and vegetable ($r = -0.24$), β -carotene ($r = -0.15$) or ascorbic acid intake ($r = -0.05$).

Conclusions – Investigations into total antioxidant capacity need to pay particular attention to sample handling, as it has been suggested elsewhere that this can be a significant source of single antioxidant deterioration. Having a biomarker for fruit and vegetable intake could prove to be a useful tool in dietary assessment, research and contribute more understanding to the diet-disease relationship.