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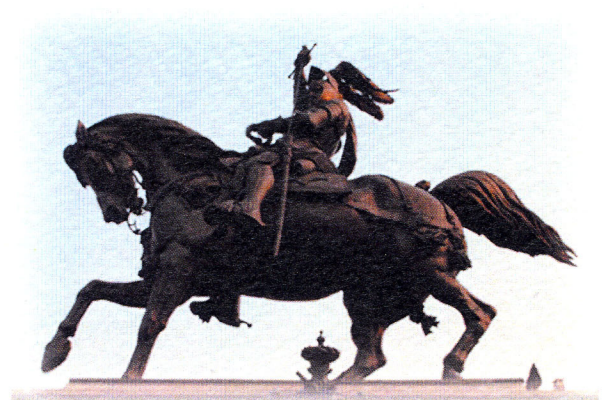


Atti del 12° Convegno Nuove acquisizioni in materia di Ippologia

Proceedings of the 12th congress
New findings in equine practice



Centro Internazionale del Cavallo
La Venaria Reale



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Druento (TO), 11th-13th November 2010

Cascina Rubbianetta Parco Regionale La Mandria
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Non invasive techniques to assess welfare on sport horses: thermography and heart rate variability

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Riassunto: Nel presente lavoro si è studiata la possibilità di utilizzo dell'heart rate variability (HRV) e della termografia quali potenziali indicatori non invasivi di stress nel cavallo atleta. Le osservazioni hanno interessato 15 cavalli ricoverati presso l'Ospedale Veterinario di Lodi (Dipartimento di Scienze Cliniche Veterinarie). Dall'analisi dei dati riguardanti la sperimentazione effettuata è possibile trarre alcune conclusioni. La termografia si è confermata essere una tecnica non invasiva in grado di misurare la temperatura cutanea, utile per dedurre possibili relazioni tra la circolazione periferica, lo stato fisiologico, quello emotivo e la presenza di particolari patologie di un soggetto. La HRV può fornire un ampio spettro di informazioni e si è dimostrata essere un indicatore utile, tuttavia sensibile a variabili quali l'orario del rilievo e la presenza di patologie respiratorie anche non evidenti. Per approfondire gli studi sarebbe opportuno ripetere la sperimentazione su un campione di soggetti più ampio e costituito da animali perfettamente sani.

Summary: In this paper we have studied the potential uses of heart rate variability and thermography as potential non-invasive indicators of stress in sport horses. The comments have affected 15 horses admitted to the Veterinary Hospital in Lodi (Department of Veterinary Clinical Sciences). Analysis of data on the tests performed we can draw some conclusions. Thermography has proved to be a non-invasive technique to measure the surface temperature and to infer possible relationships between the emotional status of a subject. The Heart Rate Variability can provide a broad range of information and has proven to be a useful indicator, however, sensitive to variables such as time of relief or the presence of respiratory diseases also not evident. Further studies would be appropriate to repeat the experiment on a larger sample of perfectly healthy subjects.

Introduction

With the growing public interest for animal welfare and protection of the natural environment, the equine species is placed in a position that deserves to be appreciated. The availability of valid and objective measures to quantify stress in horses is an important goal in order to allow proper enforcement of protection of their welfare. This paper intended to verify the feasibility and repeatability of measurements of Heart Rate Variability (HRV) and non invasive thermography as potential indicators of stress in a sample of sport horses, as already reported in other species (Kastberger and Stachl, 2003; Ludwig *et al.*, 2007).

Material and Methods

This research was performed at the Department of Clinical Medicine and Surgery of the Veterinary Hospital in Lodi. Data collection took place during the October-November 2009. The observations and data recording were made twice a day (in the morning and in the afternoon). 15 horses (1 to 17 years of age) were examined. Horses were housed in box (3m x 3m) on litter made from sawdust and were fed with hay and fodder complete integrated three times a day. They were classed as highly-reactive or normo-reactive according to a subjective evaluation made by the treating veterinarian and by the experimenter who observed horses behavior in the box and during the clinical procedures. Heart rate was telemetrically recorded using the Polar® Vantage NV HRM heart rate monitor which has the benefit of not requiring any invasive restraint. All the analysis were carried out with the threshold set at 0.05-0.15 Hz for LF and 0.15-0.5 for HF (von Borrell *et al.*, 2007). The recording of heart rate was on average 20 minutes per animal. An AVIO TVS 500 thermocamera was used for thermographic recordings. Environmental parameters such as temperature (T°C) and relative humidity (% RH) were monitored daily. About 15 images of horse's body were taken on each subject from outside the box: particularly were taken into consideration the area of the lachrymal caruncle and the perineal area.

Results and Discussion

Were performed descriptive statistical analysis to identify the mean (M), standard deviation (SD), minimum and maximum of variables recorded by Heart Rate Variability and thermographic technique. Results are shown on graphs below (Figure 1).

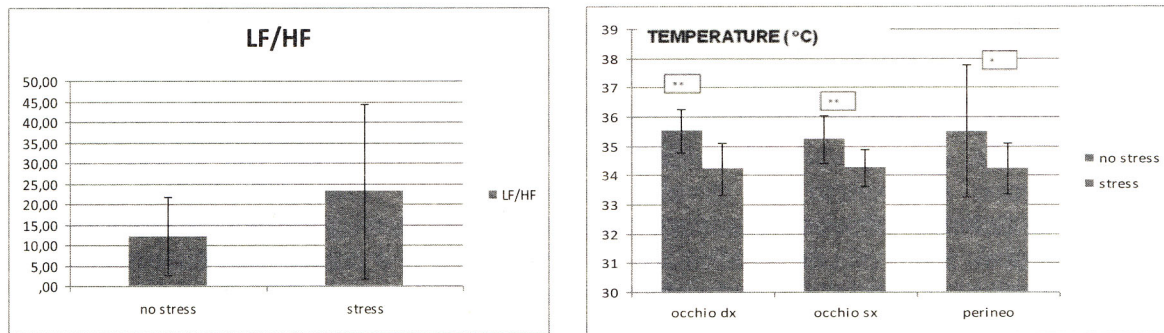


Figure 1. LF/HF and temperature values in stressed and not stressed horses.

Observing them we can see how both thermographic than LF/HF values are significantly different in highly reactive and normo-reactive animals. Particularly results for the heart Rate Variability (HRV) index are in agreement with the literature (Von Borell *et al.*, 2007) and show high variability as well as in basal conditions.

Conclusion

Thermographic measurements made on a sample of performance horses have proved feasible, reproducible and robust and could be reproduced without the animals should be subject to some advance preparation.

The Heart Rate Variability can provide a broad range of information and has proven to be a useful indicator, however, sensitive to variables such as time of relief and the presence of respiratory diseases also not evident. The sample is quite small and the experiment should be repeated on a larger sample of healthy subjects.

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