

Effect of jumping fences on heart rate, blood lactate and CK activity in show jumpers

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Introduction

Show jumping requires a combination of speed, power, endurance, experience and technical skills to compete successfully. Exercise testing in show jumpers can be required for medical or training purposes. To date, there are still few studies evaluating the effect of jumping on basic physiologic parameters. Our aim was to answer the following question: **is it necessary to integrate fences in an exercise test to evaluate properly a show jumper?** For this purpose, we compared the effect of one training session on the flat and one including 1.30 m jumps on velocity, heart rate (HR), blood lactate (BL) and creatine kinase (CK) measurements in show jumpers.

Material and methods

Ten show jumpers (8.2 ± 1.99 y.o.) in full training were recruited. Velocity and HR were assessed using respectively Equisense® and Televet® systems. Blood was recovered during and after exercise during 2 sessions, chosen randomly, at their training center, one on the flat (TEST1) and one including jumps (TEST2) (details are given in Table 1). Blood lactate and CK activity were measured; data were analyzed using a two-way parametric ANOVA or a T-test on repeated measures depending on the data, after application of a Greenhouse-Geisser correction. The experimental protocol was approved by the Ethics Committee of the University of Liège (approval no. 23195). Owners of the horses signed a consent allowing the use of their data.

		TEST1 (flat)	TEST2 (jumps)
Warm-up	Walk ₁ – both hands	5 min	5 min
	Trot – both hands	5 min	5 min
	Canter ₁ – both hands	4 min	4 min
	Walk ₂	1 min	1min
	Canter ₂ – both hands	5 min	5 min with 8 jumps
	Stop – measure lactate	30 sec	30 sec
	Walk ₃	2 min	2 min
Test	Canter ₃ – both hands	7 min	7 with 12 jumps
	Stop – measure the lactate	30 sec	30 sec
Recovery	Walk ₄ – both hands	10 min	10 min

Table 1. Description of the two exercise sessions (TEST1 and TEST2)

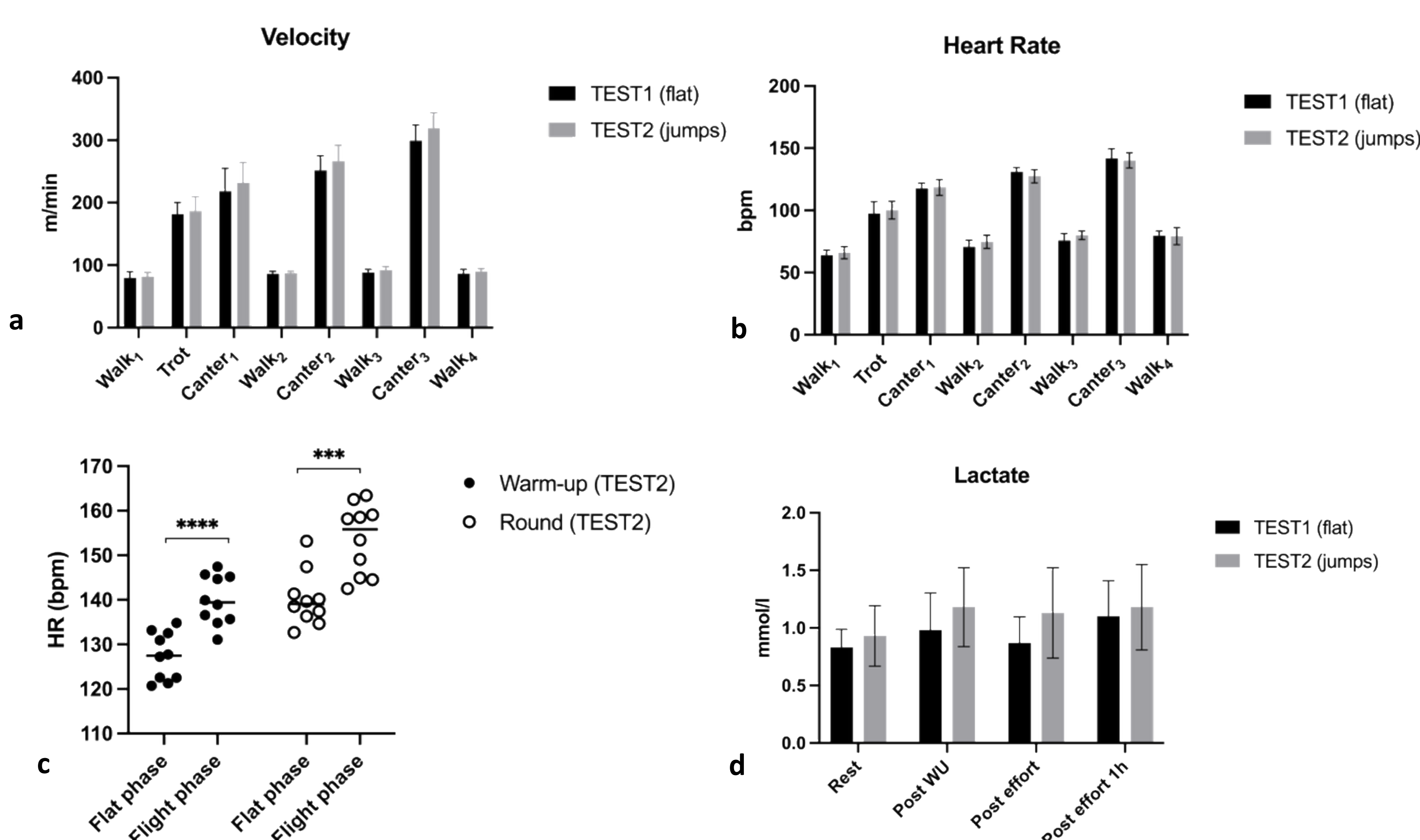


Figure 1: Mean velocity (m/min) (1a) and heart rate (bpm) (1b) of the 10 horses at each phase of TEST1 (flat) and TEST2 (jumps). Data are displayed as raw data; statistical analysis was performed on transformed data. Walk₁, Trot, Canter₁, Walk₂, Canter₂, Walk₃ : walk, trot, canter, walk, canter (with 8 jumps in TEST2) and walk of the warm-up; Canter₃: sustained canter (with 12 jumps in TEST2) of the test phase; Walk₄: walk of the recovery phase. (1c) Mean heart rate (bpm) of the 10 horses during the flat phase between fences and the flight phase (over fences) in TEST2 (with jumps). One asterisk is given for P values < 0.05, two asterisks for P values < 0.01, three asterisks for P values < 0.001 and four asterisks for P values < 0.0001. (1d) blood lactate concentration (mmol/l) before and after exercise during the two tests.

Discussion and conclusions

In our study, jumping activity did not modify BL, HR and CK values compared to an equivalent (in terms of speed and duration) flat exercise. **Only HR values were significantly higher during the suspension phase of the jump compared to mean HR when cantering between jumps.** These results have to be considered when performing an exercise test or planning a training schedule for show jumpers.