AMOUNT OF HIGH INTENSITY RUNNING IS REFLECTED IN BLOOD PHYSICAL STRESS MARKERS DURING SOCCER MATCHES IN ELITE FEMALE PLAYERS

Andersson, H. 1)2), Raastad, T.3) & Kadi, F.1)

1) School of Health and Medical Sciences, Örebro University, Sweden,
2) The Swedish Football Association, Sweden
3) Norwegian School of Sport Sciences, Oslo, Norway.

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Introduction

The running distances in speeds above 15 km h^{-1} is proposed to indicate match intensity and may contribute to fatigue. Various blood markers of physical stress may also indicate match load, e.g. creatine kinase (CK), urea and uric acid (UA). The aims were to report movement pattern and changes in blood physical stress markers after soccer matches and to investigate whether physical stress markers are related to distances in high speeds during two soccer matches played in a short period of time in elite female players.

Methods

Two teams played two 90-min matches (M1 and M2) separated by 72 h recovery. Analyses include 10 players; four defenders, three midfielders and three forwards (age 22±1 yrs; height 166±2 cm; weight 62±2 kg; VO_2peak 55±1 ml.kg^{-1}·min^{-1}; HR*peak* 196±2 beats·min^{-1}). Each player played in both matches, in the same field position and was filmed close up during the entire matches using a digital camera. The running speed ranges were: moderate-speed running (15-17 km·h^{-1}), high-speed running (18-24 km·h^{-1}) and sprinting (> 25 km·h^{-1}) (1). High-intensity running (HIR) is the sum of moderate, high-speed and sprinting distances. CK, urea, and UA were measured in plasma.

Results & Discussion

The total distances were 9.4 ± 0.8 km in M1 and 9.9±0.6 km in M2. The sprint distances were 0.098 ± 0.02 vs. 0.103 ± 0.02 km; high-speed 0.25±0.03 vs. 0.24±0.04 km and moderate speed 0.78±0.11 vs. 0.77± 0.97 km. Thus, the HIR distances were 1.09 ± 0.47 km vs. 1.10 ± 0.43 km (range 0.42 -1.98 km vs. 0.61-1.75 km). CK significantly increased by 131±24% in M1 and 123±17% in M2, UA by 8±2 and 12±1%; and urea by 13±3 and 23±4%. The increases in CK levels were significantly related to the distance covered in HIR in both matches ($p<0.05$). No other significant correlations were observed. The match distances were similar in both matches and similar to previous reports in elite female soccer (1, 2). The range of HIR distances shows large individual differences in the amount of work performed during the matches. The observed increase in CK, UA and urea suggest that both matches resulted in an enhanced physical stress. Increases in blood CK reflect increased permeability in muscle cell membranes and indicate the stress put especially on leg muscles.

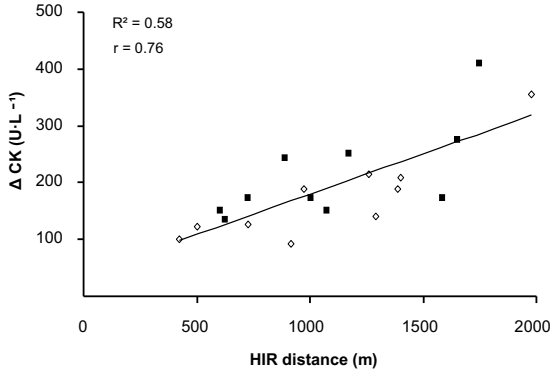

Figure 1. Relationship between HIR and CK after M1 (◊) and M2 (■).

Conclusion

The relationship between changes in CK and distances in HIR indicates that the distance ran in high speeds may be a good indicator of the stress put on leg muscles during soccer matches.

References

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