EVALUATION OF PHYSICAL LOADING, RECOVERY AND STRESS IN WOMEN'S SOCCER

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INTRODUCTION

The stress in a soccer tournament where the matches are played in very tense time table is extremely high. The training disturbs the homeostasis of many processes of the body. The regulation of the autonomic nervous system is affected by training and playing and heart rate and heart rate variability can be used to detect these changes [2]. The overload situation of the body can be noticed from the changes of the autonomic nervous system [3]. Also it has been noticed that the overload situation will weaken physical and cognitive performance [1]. The aim of this study was to test and utilize the latest know-how in heart rate based stress and recovery measurement with the Finnish women's soccer national team.

METHODS

The subjects of this study were the players of the Finnish women's soccer national team in Algarve Cup 2007 (n=14, 12 field players and 2 goalkeepers, age 23.5±2.6 y, height 169.9±5.0 cm, weight 66.9±6.3 kg).

The duration of the tournament was ten days and the team played four matches in the 3rd (FIN-SWE 0-3), 5th (FIN-USA 0-1), 8th (FIN-CHN 2-0) and 10th (FIN-NOR 0-2) day of the tournament. During the tournament the subjects collected heart rate during the matches and the nights using Suunto Smartbelt. The heart rate variability was analyzed using Firstbeat Sports 1.2.0.8 -software. The means and SDs for the peak Excess Post-exercise Oxygen Consumption -values (peak EPOC), night stress index and recovery index were calculated.

RESULTS

Figure 1 represents the means and SDs of the peak EPOC-values (ml/kg) during the match, the stress and recovery indexes for the following nights for all the players who played more than 70 minutes in a match.

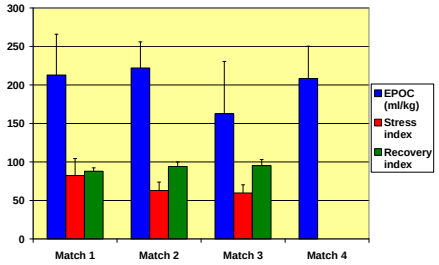

Figure 1. The means and SDs of peak EPOC-values (ml/kg) during the match, stress and recovery indexes for the players who played more than 70 minutes in the match.

Figure 2 represents the peak EPOC-values during all four matches and the stress and recovery indexes during the nights for one player during the tournament.

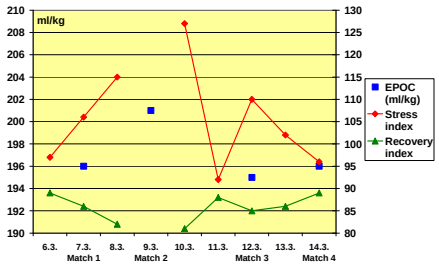

Figure 2. The peak EPOC-values (ml/kg), stress and recovery indexes for one player during the tournament.

It can be seen from figure 3 that the players mostly achieved their peak EPOC-values during the first half of the match. The drop in the peak EPOC-values was as high as 97 ml/kg for one player.

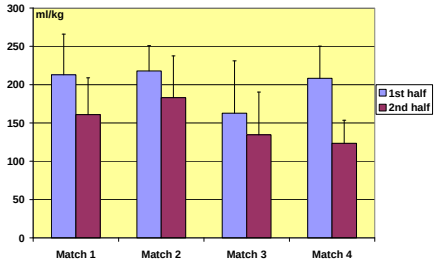

Figure 3. The means and SDs of the peak EPOC-values during the first and second halves of the match for the players who played more than 70 minutes in the match.

From the figure 4 it can be seen that the role and playing position affected to the physical stressfulness of the field players. The high peak EPOC-value for the goal keeper can be explained rather by the high mental stressfulness than by the physical loading.

Figure 4. The means of peak EPOC-values (ml/kg) for players playing in different playing positions. The means were calculated from those players who played more than 70 minutes in different matches.

CONCLUSIONS

From these results it can be speculated that these players were able to cope with the stress and demands of this kind of tournament. The field players were able to produce similar peak EPOC-values on the fourth match and the stress indexes went down and recovery indexes got up. Still it has to be noticed that the changes in the stress and recovery indexes were highly individual.

The drop in peak EPOC-values between 1st and 2nd halves probably originates from the depletion of the glycogen. Also it can be speculated that the characteristics of the match and the tactics of the team influence the stressfulness of the players. Especially this can be seen as low peak EPOC-values in match 3, where a red card was given to one of the opponent players after 23 minutes of play.

The measuring system seems to work well in team sports like soccer in controlling the stressfulness of training and matches and the level of overall stress especially when the results are interpreted individually.

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