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Monitoring Acute Fatigue in Soccer Players.

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Abstract

Monitoring fatigue is a key consideration when managing the workloads of elite soccer players. A number of potential fatigue markers have been proposed, however, little work has been done in order to assess the correlation between such measures and actual performance. Therefore, the objectives of this study were: (1) to examine the correlation between a range of simple fatigue tests and physical performance; and (2) to develop a model by which readiness to perform could be predicted. In order to do this 14 amateur soccer players completed a range of fatigue tests (countermovement jump, resting heart rate variability, functional soreness, and subjective wellness) and a performance test (3x 30 m repeated sprint test) before and after (24, 48, and 72 hours post) undertaking a soccer simulation protocol (Loughborough Intermittent Shuttle Test; LIST). Following the LIST repeated sprint performance and countermovement jump height, and heart rate variability were reduced, perceived soreness increased, and subjective wellness declined. Of the fatigue measures used, only countermovement jump height was found to be correlated with repeated sprint performance. Three models for predicting performance were developed which differed in their degree of individuality. Individual models were found to have a greater strength than the general model. For practitioners, more work is required to develop individual models, however, predictions made from individual models are likely to be more accurate. Future studies are needed to refine these models in order that they might be used in practice to make decisions about readiness to train and perform.

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List of Abbreviations

24h (48,72) = 24 (48,72) hours post-LIST

CK = Creatine Kinase

CMJ = Countermovement Jump

CV = Coefficient of Variance

ECG = Electrocardiograph

EPL = English Premier League

FORD = Free Oxygen Radical Defence Test

FORT = Free Oxygen Radical Test

FTG = Perceived Fatigue

FS = Functional Soreness

GM = General Model

GMS = Perceived General Muscle Soreness

GPS = Global Positioning Systems

HR = Heart Rate

HREx = Heart Rate during Exercise

HRR = Heart Rate Recovery

HRV = Heart Rate Variability

HSR = High Speed Running

IIM = Individual Intercept Model

ISM = Individual Slope Model

LIST = Loughborough Intermittent Shuttle Test

MD-1 (2,3,4) = Match Day Minus 1 (2,3,4)

OTS = Overtraining Syndrome

RHR = Resting Heart Rate

rMSSD = square root of mean sum of squares of differences between normal adjacent R-R intervals

RPE = Rating of Perceived Exertion

RSA = Repeated Sprint Ability

SAFT = Soccer-Specific Aerobic Fitness Test

s-IgA = Salivary Immunoglobulin A

SPR = Sprint Distance

SRQ = Self Report Questionnaires

T:C Ratio = Testosterone:Cortisol Ratio

URTI = Upper Respiratory Tract Infections

VO_{2MAX} = Maximal Oxygen Uptake

Yo-Yo IR1 = Yo-Yo Intermittent Recovery Test Level 1