

# The Relationship Between Rate of Perceived Exertion, Heart Rate, Delayed Onset Muscle Soreness, and Fatigue Induced by Sport-Specific High-Intensity Load in Young Elite Soccer Players

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## Objective:

To examine the relationship between fatigue induced by sport-specific high-intensity load, rate of perceived exertion (RPE), heart rate (HR), and delayed onset muscle soreness (DOMS) in young elite soccer players.

## Subjects:

A total of 67 elite young soccer players (age:  $16.3 \pm 0.8$  years, weight:  $69.0 \pm 8.7$  kg, height:  $179.4 \pm 8.3$  cm, BMI:  $21.3 \pm 1.4$  kg/m<sup>2</sup>).

## Observation Technique:

The test battery included assessments of speed and strength (30-m sprint, countermovement jump), sport-specific skills (change of direction (COD), agility *t*-test, dribbling), and anaerobic endurance (repeat sprint ability (RSA) test using a 6 × 20/20-m protocol with 20 seconds of passive rest between sprints).

## Outcome Measures:

RPE was measured using the Borg Scale-10 five minutes after the RSA. Heart rate post-exercise (HRpe) and after 2 min of rest (HRrest) were measured using the Activio Sport Solution system. Heart rate recovery (HRrec) was calculated as the difference between HRpe and HRrest. DOMS severity was assessed 24 hours post-exercise using a ten-point visual analog scale. Fatigue index and percentage decrement score (Sdec) were calculated based on RSA results using standardized formulas. Correlations between variables were classified as strong (0.70-1.00), moderate (0.30-0.69), or weak (0.01-0.29). Normality of distribution was evaluated using the Shapiro-Wilk test. Pearson's or Spearman's correlation tests were used to analyze relationships between variables.

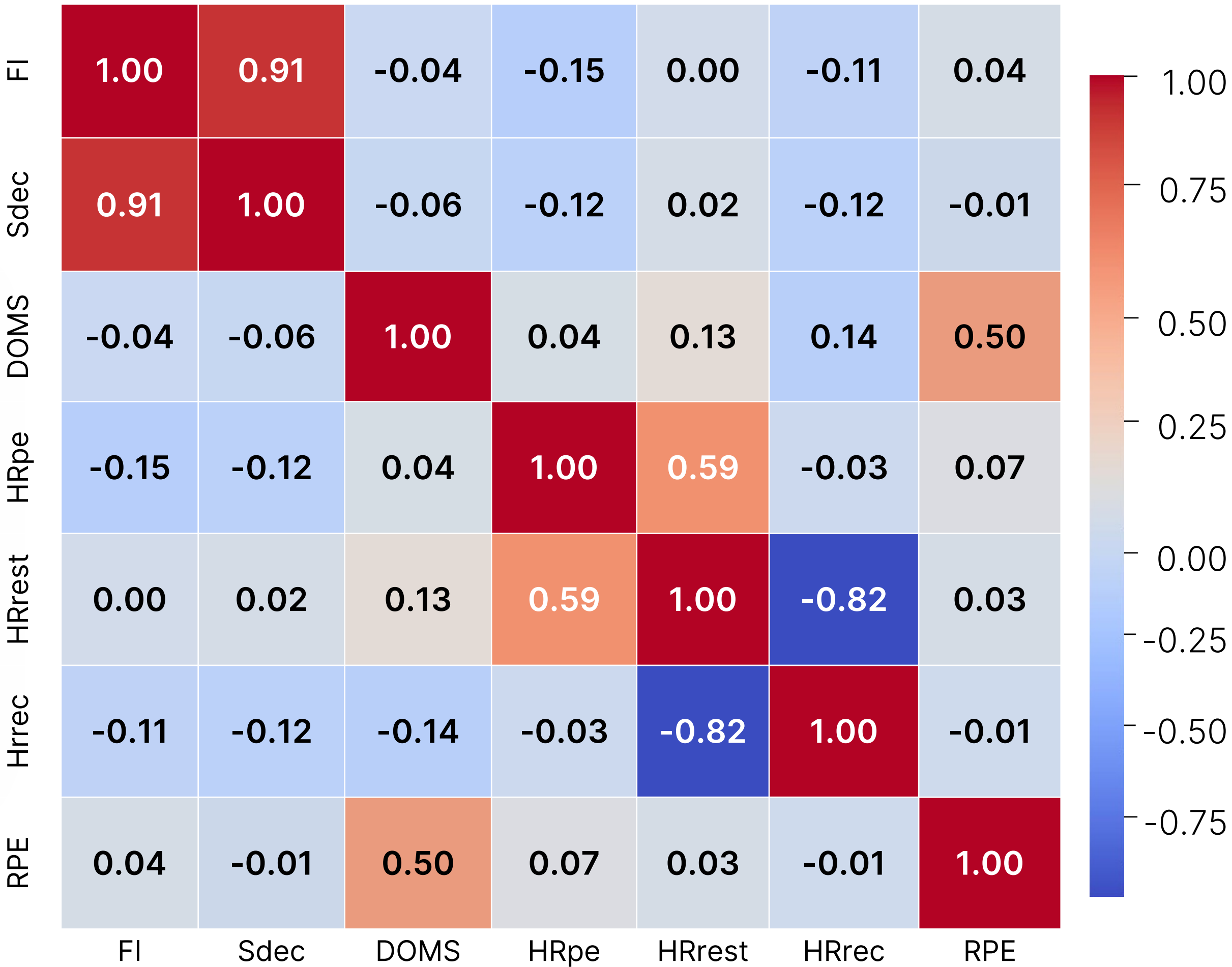
## Results:

A moderate positive correlation was found between RPE and DOMS severity ( $r_s=0.497$ ,  $P < 0.0001$ ). No significant correlations were observed between other parameters.

## Conclusions:

RPE measured using the Borg Scale-10 is **positively correlated with DOMS severity** 24 hours after high-intensity sport-specific exercise in young elite soccer players. These findings suggest that **RPE immediately post-exercise may serve as a predictor of DOMS severity**, and may help to optimize post-exercise recovery strategies.

Correlation Matrix Heat Map



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