EXTERNAL TRAINING LOAD AND PERCEIVED EXERTION IN AMERICAN PROFESSIONAL SOCCER

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Purpose

To compare the relationship between external training load and session rating of perceived exertion (s-RPE) in United Soccer League one (USL-1) professional soccer players.

Methods

From twenty-three male United Soccer League (USL1) players, 95.48 ± 20.40 training sessions were analyzed, resulting in 2,180 samples. Ratings of perceived exertion (RPE) were collected after each training session, and multiplied by the training duration to calculate session RPE (s-RPE). Microtechnology devices provided external training load (distance, distance covered in zone 3 (3-4 m/s), zone 4 (4-5.5 m/s), zone 5 (5.5-7 m/s), and zone 6 (7-11 m/s), average speed, sprint distance (≧ 5.5 m/s), total player load (PL) and lower speed loading (LSL)). Pearson product moment correlations were conducted to examine the relationship between s-RPE and external training load variables with an alpha level of 0.05.

Results

Statistical analyses suggested multiple weak to strong correlations between external training load measures and s-RPE. Total distance (r = 0.627, $p < 0.001$, **Figure 1**), distance covered in zone 3 (r = 0.554, $p < 0.001$, **Figure 2**), distance covered in zone 4 (r = 0.557, $p < 0.001$, **Figure 3**), distance covered in zone 5 (r = 0.458, $p < 0.001$, **Figure 4**), distance covered in zone 6 (r = 0.358, $p < 0.001$, **Figure 5**), total sprint distance (r = 0.458, $p < 0.001$, **Figure 6**), average speed (r = 0.245, $p < 0.001$), total player load (r = 0.587, $p < 0.001$, **Figure 7**), and low speed loading (r = 0.441, $p < 0.001$, **Figure 8**) were all positively correlated with s-RPE suggesting that an increase in these external training loads related to an increase in perceived training exertion.

Results/Figures

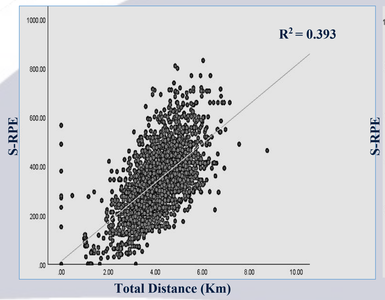

Figure 1: Correlation between s-RPE and Total Distance (Km)

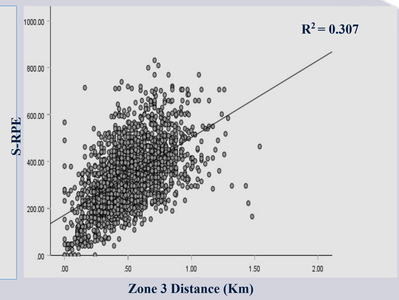

Figure 2: Correlation between s-RPE and distance in speed zone 3 (Km)

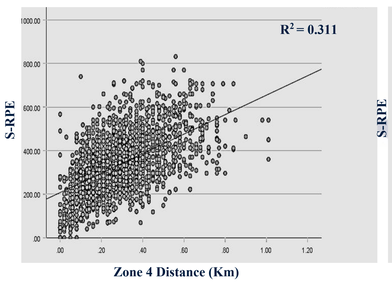

Figure 3: Correlation between s-RPE and distance in speed zone 4 (Km)

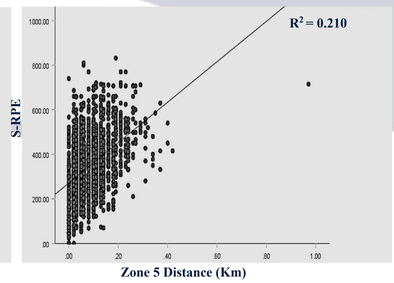

Figure 4: Correlation between s-RPE and distance in speed zone 4 (Km)

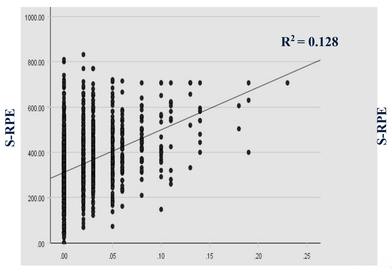

Figure 5: Correlation between s-RPE and distance in speed zone 6 (Km)

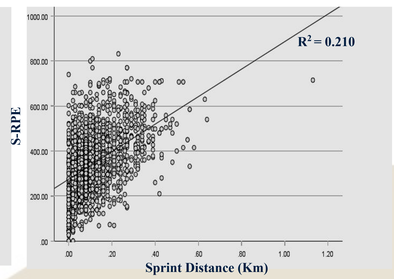

Figure 6: Correlation between s-RPE and sprint distance (Km)

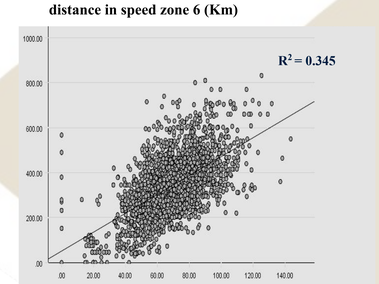

Figure 7: Correlation between s-RPE and total loading (Km)

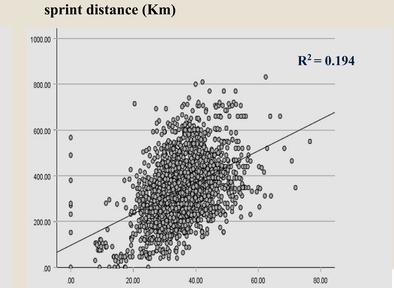

Figure 8: Correlation between s-RPE and sprint distance (Km)

Conclusion

Workload during team training sessions may impact the relationship between external training load and s-RPE training load. This suggests that a given external training load may result in different internal responses between athletes. Previous research has suggested that s-RPE is a useful tool in monitoring training load in youth soccer and elite level soccer players, particularly when microtechnology devices may not be available. The current findings in lower tier professional American soccer corroborate those results. It should be noted that total distance covered, total player load, and distance covered in speed zones 3 and 4 were most correlated with s-RPE. This suggests that as total distance and/or total player load increase, so should s-RPE. s-RPE may not be influenced the same by external load factors like average speed or distance covered only in zone 6.

Practical Application

The findings of this study have important implications for coaches and training staff in the context of soccer training and player management. Understanding the relationship between external training load and session RPE allows for the monitoring of fatigue and recovery and the mitigation of risk from overtraining. Session RPE may also be a convenient application for organizations who may not have the funding for microtechnology devices to monitor external and internal training load during training sessions. However, further studies should focus on the use of s-RPE on training sessions focused on short distance, higher acceleration movements and coaches should use caution in using s-RPE during these types of training sessions in soccer athletes. While our findings do suggest that s-RPE is associated with these sessions, it appears more associated with sessions that cover more distance and at lower speed zones.

References

- Marynowicz, J., Kikut, K., Lango, M., Horna, D., & Andrzejewski, M. (2020). Relationship Between the Session-RPE and External Measures of Training Load in Youth Soccer Training. *Journal of strength and conditioning research*, *34*(10), 2800–2804. https://doi.org/10.1519/JSC.0000000000003785

- Casamichana, D., Castellano, J., Calleja-Gonzalez, J., San Román, J., & Castagna, C. (2013). Relationship between indicators of training load in soccer players. Journal of strength and conditioning research, 27(2), 369–374. https://doi.org/10.1519/JSC.0b013e3182548af1