The Relationship between Objective and Subjective Markers of Training Stress in NCAA Division I Collegiate Basketball Players

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Abstract

An athlete’s training stress score (TSS) is an objective marker of overall training volume and can be determined by tracking total time spent at specific heart rate (HR) zones. Additionally, an athlete’s power factor (PF) or explosive strength is an important marker that can be measured objectively with power testing equipment. While these measures of training stress and performance are important, a coach with limited resources may not have access to the equipment or expertise to measure these variables. On a subjective level, perceived recovery status (PRS) and rating of perceived exertion (RPE) are subjective markers of training stress. While the relationship between these objective and subjective markers of training stress have been studied in endurance sports, less descriptive data is available for the relationship between objective and subjective markers of training stress in team sports, particularly women’s basketball.

Introduction

Purpose: To determine the relationship between PRS and PF, PRS and TSS, and PRS and RPE in NCAA Division I female basketball athletes. Methods: Data was collected over several weeks during both the off-season and competition season in 12 NCAA Division I women’s basketball players. Prior to practices at the end of the week, their PF was measured by performing a 4-jump test on a jump mat. Increased PF values indicate more explosive strength. The players also indicated their subjective rating of recovery on the PRS index before practice with higher values indicating the player felt more recovered. RPE was measured after each practice as a rating of how hard the player felt practice was with higher values indicating a more stressful practice. Finally, their TSS was calculated for the entire week by measuring their heart rates and time spent in specific HR zones. The relationship between PRS-PF, PRS-TSS, and PRS-RPE was then calculated by Pearson correlations. Results: Comparing PRS- PF, there was a weak positive correlation (r = .305) on average for the team, while seven of the twelve players (58%) had at least a moderately positive correlation (r > .3). PRS-TSS displayed a very weak negative correlation (r = -.07). PRS-RPE showed a very weak positive relationship (r = .41). Conclusion: We hypothesized that the athlete felt more recovered (higher PRS), their explosive strength measured by the jump test would also increase (higher PF). Over half of the players observed could provide an accurate subjective measure of how prepared they were for practice that correlated with their actual explosive strength prior to practice. For these athletes, the PRS might be a useful surrogate to daily power testing. This would allow the coach to adjust practice accordingly without the need for special equipment or additional testing. While examining the other relationships, PRS vs TSS and PRS vs RPE, we did not see a strong relationship in either. This might indicate that quantifying training stress by HR measurement may not be easily replaced by subjective measures.

Results

• PRS-PF had a weak positive correlation (r = .305) on average for the team; however, when looking at individual subjects, seven of the twelve (58%) had at least a moderately positive correlation (r > .3)
• PRS-TSS displayed a very weak negative correlation (r = -.077)
• PRS-RPE showed a very weak positive correlation (r = .141), as did TSS-RPE (r = .085).

Conclusions

• Over half of the players observed could provide accurate subjective measures of how recovered they were for practice (PRS) that correlated with their actual explosive strength (PF) prior to practice.
• These athletes might be able to use the PRS index as a surrogate to daily power testing, allowing coaches to adjust accordingly prior to the start of practice and according to the athletes needs without using special equipment or additional testing.
• The relationships between PRS vs TSS, TSS vs RPE, and PRS vs RPE did not show a strong relationship which may indicate that measuring training stress by HR measurement may not be easily be replaced by subjective measures.