

THE PHYSIOLOGICAL RESPONSE AND WORK RATE DEMANDS OF REFEREEING RUGBY UNION SUPER 14 GAMES

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Introduction

There has been limited research with rugby union referees. This is surprising as the decisions made by match officials often determine the outcome of a game (Martin, 2001). The purpose of this study was to quantify the physiological response and work rate demands of professional rugby union refereeing.

Methods

Nine referees from this population wore Global Positioning System (GPS) units during a total of 11 games throughout the 2007 Super 14 season. One-way analysis of variance (ANOVA) with repeated measures was used to analyse mean (\pm SD) of performance measures heart rate (HR), speed (Sp) and distance (D) between four game segments of each half. HR rest zone included $<80\%$ of maximum game heart rate ($HR_{\max \text{ game}}$) while work ranged from $\geq 80\%$ $HR_{\max \text{ game}}$. Sp rest zone included $<3.6 \text{ ms}^{-1}$ and work ranged from $\geq 3.6 \text{ ms}^{-1}$.

Results & Discussion

Match play intermittent patterns were evident from the varied proportion of time spent in the HR and Sp work and rest zones. HR increased through the first and second halves. In contrast, Sp decreased and increased through the first and second halves respectively (Figure 1). This reflected game strategy. For HR, the majority of the mean percentage time was spent in the two work zones; 3 ($41.6 \pm 4.4\%$) and 4 ($22.3 \pm 10.9\%$). Time spent in zone 3 (threshold stress, $80\text{-}89\%$ $HR_{\max \text{ game}}$) was significantly different to the other three zones ($p < .01$). For Sp, a greater mean percentage time was spent in the two rest zones; 1 ($76.6 \pm 1.8\%$) and 2 ($10.9 \pm 0.9\%$). Time spent in zone 1 (stand still-limited, $0\text{-}2 \text{ ms}^{-1}$) was significantly different to the other three zones ($p < .001$). The total mean D covered in a game was $8030.7 \pm 506.6 \text{ m}$.

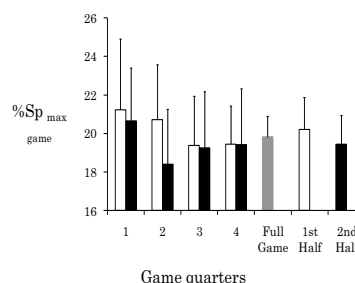


Figure 1. The relative mean (\pm SD) referee speed as a percentage of game maximum in the first and second halves, eight segments and full game.

Conclusion

The results of this study suggest that refereeing rugby union at the professional level is a highly intermittent, variable intensity, activity, with likely stress on both the aerobic and anaerobic energy systems. Both response and demand requirements tend to increase towards the end of each half. While HR provides an indication of the level of physiological stress, speed and distance may better reflect the energy system demands. These results have implications for the development of physical conditioning programmes and assessment methods that reflect these specific requirements.

References

1. Martin, J. et al. (2001). *Ergonomics*, 44(12): 1069-1075