The effect of half time re-warm-up routines on second half sprint performance in soccer

Fraser Houston and Clare Smith-Pheasey
Department of Exercise & Sport Science, MMU Cheshire

Introduction

Various studies have found soccer players, referees and assistant referees perform less high-intensity running in the initial phase of the second half compared with the first half of the match. Such findings suggest the normal routine of resting for the entire 15 minute half-time interval in soccer may not provide optimal preparation for the second half.

Mohr et al. (2004: Scandinavian Journal of Medicine and Science in Sports, 14(3), 156-162) investigated the effects of rest and moderate re-warm-up during half-time, on initial sprint performance during the second half of a soccer match. These authors observed a significant negative correlation between the decrease in sprint performance and decrease in muscle temperature at half-time.

However, the methods used to re-warm participants were limited in number and vague in description (either no activity or running exercise at moderate intensity).

Purpose

To further investigate the effects of re-warm-up routines on sprint performance at the start of the second half.

Method

With institutional ethics approval, nine university 1st team soccer players (mean ± SD, age 20.5 ±2 years, body mass 4.1 ± 4.2kg and stature 176.4 ± 8.4cm) participated in 3 trials separated by at least 2 days of non-activity, within a 2 week period. Heart rate (HR) was recorded throughout each trial using the Polar Team System™. Participants performed a standardised 20 minute warm-up consisting of dynamic stretching, sprinting and basic passing. A Repeated Sprint Test (RST1) consisting of 3 maximal sprints separated by ~30s of walking, with timing gates placed at 5, 10 and 15m, followed the warm up. A 45 minute 11-a-sided soccer match was then played, with all participants occupying an outfield position. Participants moved to the laboratory at the onset of half-time (~1 minute). The 15 minute half-time period consisted of 7 minutes of seated rest for all participants, followed by 7 minutes of a routine. Participants were randomly assigned to one of three half-time routines; (i) seated rest (SR); (ii) cycling at 50-60% HR_{max} (C50); or (iii) cycling at 70-80% HR_{max} (C70). Approximately 1 minute post half-time a second Repeated Sprint Test (RST2) was performed. All participants repeated all 3 routines within a 14 day period.

Data Analysis

A repeated measures one-way ANOVA followed by a Bonferroni correction examined changes in RST times.

Results

All routines RST2 times were slower over all distances than RST1. In routine SR RST2 times were significantly slower compared to RST1 times over 5m ($p<0.05$, Fig 2.). RST2 times over 10m and 15m showed no significant difference between the 3 routines.

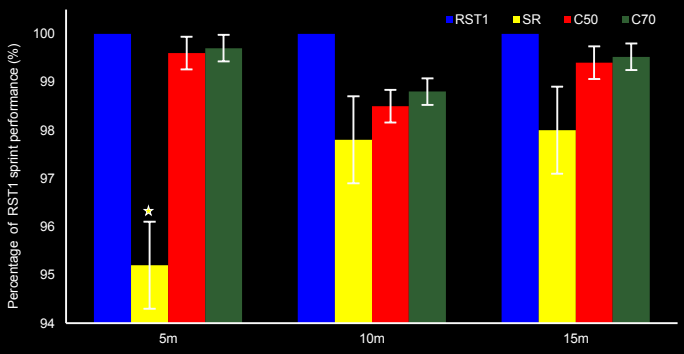

Figure 2: Percentage change in sprint performance (RST2 (mean time) as a percentage of RST1 (mean time))

* :significant difference between RST1 and RST2 values ($P<0.05$)

Conclusion

Consistent with Mohr et al. (2004), inactivity during a half-time period decreased 5m repeat sprint performance in comparison to pre-match performance. However, cycling at 50% or 70% of HR_{max} during a re-warm-up period had a non-significant effect on 5m sprint performance compared to pre-match. Thus, to maintain 5m pre-match sprint performance a period of active re-warm-up is more appropriate than non-activity, however the intensity of active re-warm-up appears to be independent.

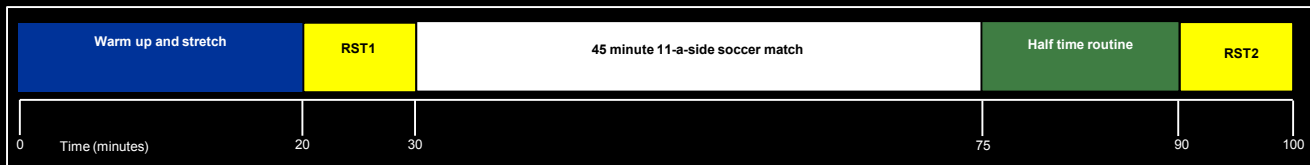

Figure 1: Experimental Protocol