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External match-play loads in elite female assistant soccer officials

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INTRODUCTION:

In soccer, little research has examined the general physical demands of match-play in the contemporary elite female central referee [1] and to our knowledge, none exists in assistant referees (AR). Recent research [2] has shown that female central referees experience temporal deteriorations in physical performance across match-play. Once again however, no study has attempted to confirm whether similar declines occur in AR. This study aimed to 1) describe the overall external match loads in elite female AR during official matches, 2) compare performance across halves and whether decrements occur during the final 15-minute intervals of each match half.

METHODS:

Altogether, 6 elite French AR (age 28.9 ± 5.1) participated. Data were collected in 229 competitive matches over 3 consecutive seasons (2020/21-2022/23). The sample included domestic French female and male league (female D1, D2 and male D4) and cup matches and female international youth & senior matches. Global Positioning Systems (Catapult One, Catapult, Australia) were used to collect the data. Each participant wore the same device during the entire duration of the study. External load variables analysed for the match overall included: total distance covered (TD), distance $>13\text{km/h}$ ($D>13\text{km/h}$) and $>19\text{km/h}$ ($D>19\text{km/h}$), frequency of accelerations & decelerations ($>3\text{m/s}^2$) and maximal speed attained (MS, km/h). Percentage changes in TD & $D>13\text{km/h}$ and $D>19\text{km/h}$ were analysed across match halves and for the first 15-minute match interval versus the final 15-minute interval in each half (data analysed per minute of play to account for end-half injury time). Effect sizes (ES) are reported for differences in mean values (classified as small [0.2], moderate [0.6], large [1.2], very large [2.0] and extremely large [4.0]).

RESULTS:

Overall match data were $\text{TD}=5112.7 \pm 827.1\text{m}$, $D>13\text{km/h}=732.0 \pm 334.8\text{m}$, $D>19\text{km/h}=104.0 \pm 80.9\text{m}$, accelerations= $36.0 \pm 21.8\text{m}$, decelerations= $52.1 \pm 31.5\text{m}$ and MS: $22.4 \pm 1.9\text{km/h}$. 1st versus 2nd half changes for TD, $D>13\text{km/h}$ and $D>19\text{km/h}$ respectively were: -3.9%, +2.7% and -8.1% (ES: -0.3, +0.2 and -0.2 [all small]). Changes in TD, $D>13\text{km/h}$ and $D>19\text{km/h}$ for the first 15-minute match interval compared to the final 15-minute interval both in the 1st half and 2nd half respectively were: -8.7% (ES =-0.6, moderate), -25.6% (ES =-0.7, moderate) and -29.4 (ES= -0.5, small] and -10.4% (ES =-0.9, moderate], -18.1% (ES =-0.5, small] and -27.0% (ES: -0.6 [moderate]).

CONCLUSION:

This study has established the general physical match demands for elite French female assistant referees in national and international soccer match-play (total distance covered= $\sim 5\text{KM}$ of which $\sim 14\%$ run at speeds $>13\text{km/h}$ and $\sim 2\%$ $>19\text{km/h}$). It also shows that small to moderate temporal declines in running performance occur across competition. While this result suggests a need for specific physical conditioning practices to counter fatigue, additional research is necessary to account for the effects of contextual factors.

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