

Heart rate profile of a junior mid-field player during a local derby match.

Background: Heart rate (HR) monitoring is becoming an increasingly popular tool when looking to determine exercise intensity. The training principle of specificity states that all training adaptations are specific to the stimulus applied; therefore, one could speculate that the most appropriate activity for improving football specific fitness is actually playing football itself. However, given that the intensity of exercise required to develop aerobic fitness must meet or exceed 90% of maximal HR values, it is unclear that participation in match-play is of a high enough intensity to improve a player's fitness compared to individualised fitness sessions. Therefore, we fitted a commercially available HR monitor to a 15 year old attacking midfield player during a local derby match. The player in question was on the winning team (Score: 5 – 4) and played for the full 90 minutes.

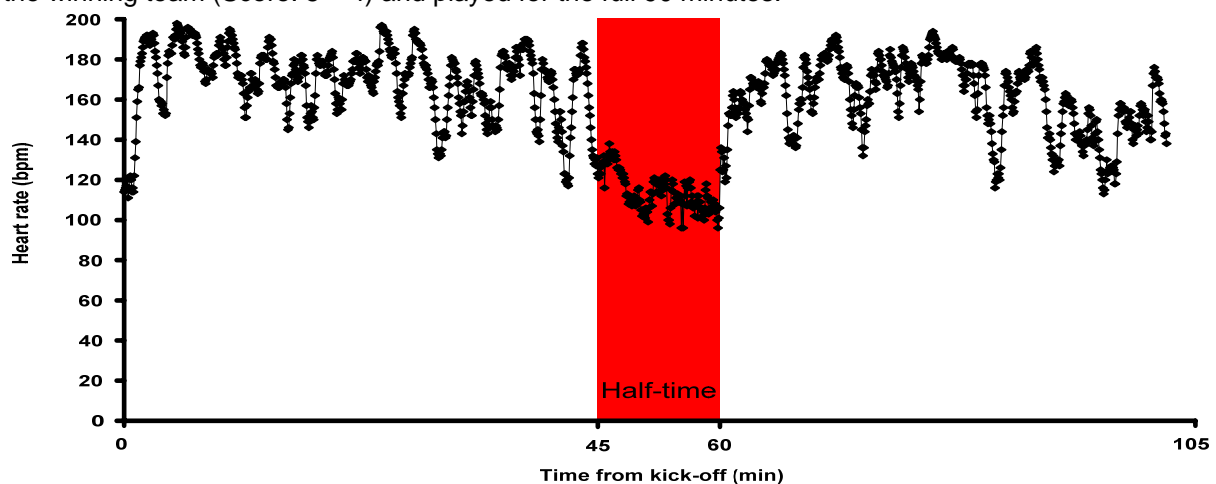


Figure 1: HR profile of the player during the match

Results: Figure 1 outlines the HR trace during the 90 min of match-play and the 15 min half-time period. Table 1 outlines the environmental conditions of the match and the proportion of time that the player's HR was at a certain intensity of his maximum HR value (HR max).

Table 1: Environmental and HR data during the game

Variable	Exercise only (90 min)	Full 105 min duration
Temperature	5 degrees C	
Mean HR	166 bpm	160 bpm
HR zone 1	11%	22%
HR zone 2	24%	21%
HR zone 3	45%	40%
HR zone 4	20%	17%
HR zone 5	0%	0%

NOTE: HR zone 1 = < 70% HR max, HR Zone 2 = 71 – 80% HR max, HR zone 3 = 81 – 90% HR max, HR zone 4 = 91 – 100% HR max, HR zone 5 = > 100% HR max.

Discussion: Results in this study seem to suggest that the intensity of a game is not high enough to increase fitness levels. Similar to previous research, the majority of time was spent in activity that was less than 90% HR max; it is therefore unlikely that match-play alone would improve fitness levels and that other approaches to improving maximal aerobic capacity of football players are required. Although it is difficult to generalise results from one player to all, midfield players have previously been reported to cover the greatest distances during a match and it can therefore be implied that these players have the highest work-rates. Consequently, as the player whose data is presented here was a midfielder, it can be assumed that he would have had one of the highest work rates during the game and yet still spent less than 20% of the time above 90% HR max which is required for fitness gains.

Conclusion: Match-play is not of high enough intensity to increase aerobic fitness levels and other more specific approaches should be used when looking to increase the fitness levels of players.