D1.S4.4(2). Rugby-specific static activities: Are they actually high-intensity?

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Introduction: Rugby Union is characterised by frequent short-duration bouts of high-intensity activity usually lasting one to two minutes of ball in play time. Rugby-specific activities such as rucks, mauls, scrums, and line-outs have been classified in the existing literature as "high-intensity static activity" or "static exertion" (Roberts et al., 2008, *Journal of Sports Sciences, 26*(8), 825–833). This is usually based on the data from GPS units, indicating a combination of high player demand completed at low-speed (McLaren et al., 2016. *Journal of Science and Medicine in Sport, 19*(6), 493–497). However there is little knowledge of whether static activities result in high internal physiological demand on the players, therefore the aim of the study was to determine the physiological response to static activities and classify them according to demand thresholds. Methods: Data was collected from six female players in four English Premier15s league matches after institutional ethical approval was obtained. Each player wore a Catapult Mininmax GPS unit to measure overall player load (PL) and player load at slow velocities (<2 m·s^{-1}; PL_{slow}) and a Zephyr Bioharness to obtain heart rate (HR) and ventilator frequency (VF) data. All games were filmed to identify instances of scrums, tackles, rucks, mauls, and lineouts, with the time frame of each activity involving one of the six players recorded, which were subsequently used to segment the physiological and player load data. Maximum and mean HR and VF were calculated for each individual activity segment and classified according to standardised threshold bands calculated from peak in-game values (0-60% Low; 61-70% moderate; 71-80% vigorous; 81-90% high; 91-100% very high – maximal). Results: All five types of static activity predominately produced heart rates and breathing rates classified as high intensity. Mauls and scrums were the most intense static activity with 93% of all mauls and 91% of all scrums producing high-intensity physiological responses, with mauls producing the highest mean heart rate (171 bpm) and ventilator frequency (42.6 breaths·min^{-1}). Similarly, highest player loads were found in maul activities, with strong correlations between physiological load and player load ($r^2 = 0.82–0.94$). Conclusion: Rugby-specific activities are correctly classified as high-intensity due to the increased physiological responses observed within games. Despite their infrequent nature, scrums and mauls result in the greatest increases in heart rate and ventilator frequency as a result of the longer time frame compared to rucks and tackles. Strong relationship with PL_{slow} confirms the static nature of the activities.