

# Player Load Monitoring in Elite Rugby Union



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## Purpose

Elite Rugby Union players are placed under strenuous demands in both training and match play. The loads associated with these demands have previously been shown to influence player injury risk<sup>(1,2)</sup>. Consequently, player load monitoring is imperative to ensure training programmes encourage exercise-induced adaptations<sup>(1)</sup>, whilst simultaneously allowing for appropriate rest and recovery<sup>(2)</sup>. Various measures can be used to quantify player load throughout a season. The purpose of this study was to show how the different measures used to quantify load can provide various impressions of player load over a Rugby Union season.

## Methodology

A prospective, observational cohort study design was adopted to collect exposure data for all pitch-based training sessions & competitive matches. All first team players ( $n = 148$ ) contracted to the Scottish Rugby Union's professional (Men's 15-a-side) teams (Men's International Squad; Glasgow Warriors and Edinburgh Rugby) were used in this study. Data were collected over the 2017/18 season via Global Positioning System (GPS) devices (Catapult's Optimeye S5 devices and GPSports EVO devices).

All training sessions completed in a day were summed to give each player's daily training exposure<sup>(2)</sup>. Weekly exposure's were then calculated by summing each 7-day period (including match exposure)<sup>(1)</sup>. Acute: chronic workload ratio (ACWR) measures (rolling and exponentially weighted moving average; EWMA) were then calculated from each player's exposure data, as well as week-to-week absolute changes in exposure, and 2-, 3- and 4-week cumulative exposures.

## Results

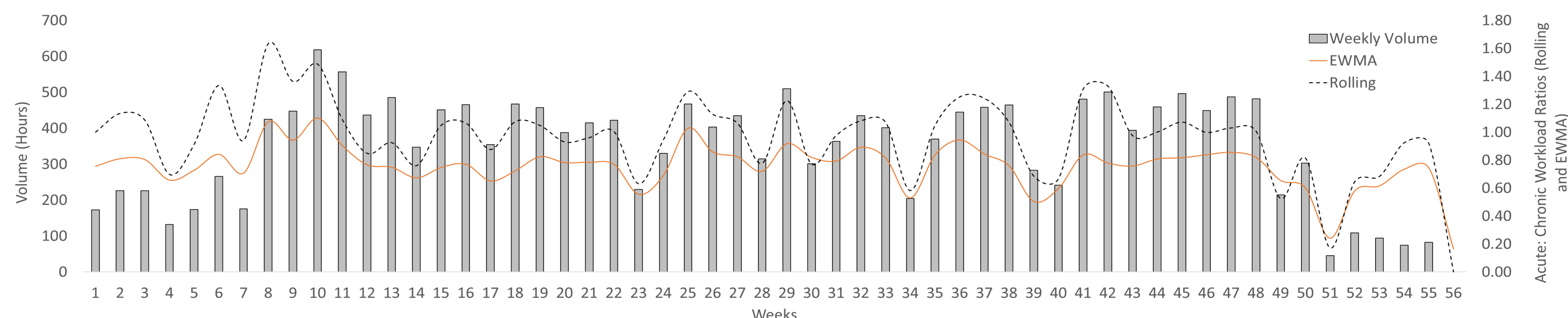


Figure 1. Rolling vs. exponentially weighted moving average (EWMA) acute: chronic workload ratios for training and match exposure throughout the season

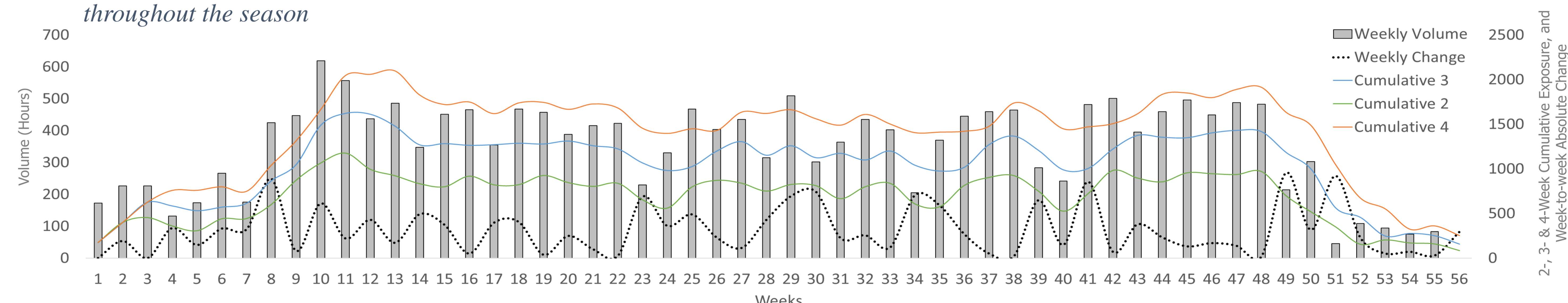


Figure 2. Week-to-week absolute change for training and match exposure, and 2-, 3- & 4-week cumulative exposure throughout the season

## Results

Throughout the season, players spent a total of 19435.2 hours engaging in pitch-based training and match play. This equated to 17785.9 hours of pitch-based training, and 1649.3 hours of match play. On average, players were exposed to 4.74 ( $\pm 2.2$ ) hours of training and match play per week. Squads averaged 347.1 ( $\pm 145.9$ ) hours of training and match play per week (See Figure 1 for weekly exposure). Over the season the rolling ACWR was 0.97 ( $\pm 0.28$ ), whereas the EWMA ACWR was 0.76 ( $\pm 0.16$ ). The average week-to-week change in exposure was 87.4 hours ( $\pm 73.2$ ). For cumulative 2-, 3- and 4-week measures, squads were exposed to 694.1 ( $\pm 267.4$ ), 1039.7 ( $\pm 385.4$ ) and 1384 ( $\pm 500.5$ ) hours, respectively (See Figure 2). \* **Note:** values are expressed as mean ( $\pm$  standard deviation).

### References

- (1) Cross, M. J., Williams, S., Trewartha, G., Kemp, S. P. T. and Stokes, K. A. (2016) 'The influence of in-season training loads on injury risk in professional rugby union', International Journal of Sports Physiology and Performance, 11(3), pp. 350-355.
- (2) Williams, S., Trewartha, G., Cross, M. J., Kemp, S. P. T. and Stokes, K. A. (2017) 'Monitoring What Matters: A Systematic Process for Selecting Training-Load Measures', International Journal of Sports Physiology and Performance, pp. 101-106.
- (3) Vanrenterghem, J., Nedergaard, N. J., Robinson, M. A. and Drust, B. (2017) 'Training Load Monitoring in Team Sports: A Novel Framework Separating Physiological and Biomechanical Load-Adaptation Pathways', Sports Medicine, 47(11), pp. 2135-2142.

## Conclusion

Various tools can be used to interpret exposure data throughout the season. Depending on the measures adopted, team coaches and practitioners will see a different impression of how the exposure data collected over a season can influence player-load. In turn, this gives coaches and practitioners a greater understanding of how player-load may influence injury risk. Training and match exposure will also likely differ depending on the positional groupings used, and periodization strategies adopted by the teams involved, therefore positional and team comparisons are also recommended.