

Introduction: Rugby is one of the most physically demanding team sports worldwide and carries high risk of injury due to frequent collisions and high physical loads. The acute: chronic workload ratio (ACWR) is a commonly used metric that compares recent training load to longer-term workload and has been associated with injury risk in several high-intensity sports. Evidence evaluating the relationship between ACWR and injury risk in professional rugby remains limited. The purpose of this study was to determine the relationship between mean ACWR at the team-level and time-loss injuries over a single season of professional men's rugby.

Methods: GPS-derived workload data were collected from professional male rugby players aged 21-34 during a 22-week season that included 24 matches. Player workload was measured using Catapult accelerometer units. Weekly ACWR was calculated as the ratio of the current week's workload to the mean workload of the previous four weeks. Team mean ACWR was calculated as the average of individual player ACWR values for each week. Time-loss injuries were assigned to their corresponding weeks. Analyses were restricted to 19 team-weeks with complete ACWR data. Injury and non-injury weeks were compared using Welch's t-test, and logistic and Poisson regression models assessed associations between ACWR and injury outcomes.

Results: Of the 19 weeks analyzed, 12 included at least one time-loss injury and 7 included none. Mean team ACWR did not differ between injury and non-injury weeks (0.83 ± 0.35 vs 0.84 ± 0.34 , $p = 0.922$) (table 1). Regression analyses showed no significant association between mean ACWR and injury occurrence or rate (table 2).

Table 1. Comparison of team mean acute:chronic workload ratio between injury and non-injury weeks in the 19-week analytic sample.

Group	n (weeks)	Mean ± SD ACWR	t-statistic	p-value
Injury weeks	12	0.83 ± 0.35		
Non-injury weeks	7	0.84 ± 0.34		
Statistics				
Welch's t-test			-0.10	0.922

Table 2. Regression models examining the association between team mean acute:chronic workload ratio and weekly injury outcomes.

Model	Outcome	Effect per 0.1 ACWR	95% CI Lower	95% CI Upper	p-value	n weeks
Logistic regression	Injury_Week (1 vs 0)	0.985	0.742	1.308	0.917	19
Poisson regression (sensitivity)	Time-loss injury count (per week)	1.009	0.905	1.125	0.870	19

Effect estimates are expressed per 0.1-unit increase in team mean ACWR. Logistic regression modeled the odds of an injury week, and Poisson regression modeled the weekly count of time-loss injuries.

Conclusion: Team mean ACWR was not associated with weekly time-loss injuries in this professional male rugby cohort. Larger multi-season, player-level studies are needed to clarify its role in injury risk prediction.