In-season Internal Load and Wellness Variations in Professional Women Soccer Players: Comparisons Between Playing Positions and Status

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INTRODUCTION

The internal intensity monitoring in soccer has been used more in recent years in men's football, however, in women's soccer, the existing literature is still scarce. The aims of this study were threefold: (a) to describe the weekly variations of training monotony (Foster, 1998), training strain and acute:chronic workload ratio (Murray et al., 2017) through session Rated Perceived Exertion (s-RPE); (b) to describe weekly variations of Hooper Index [stress, fatigue, Delayed Onset Muscle Soreness (DOMS) and sleep] (Hooper & Mackinnon, 1995); and (c) to compare those variations between playing positions and player status.

Table 1:. Descriptive statistics (mean ± SD) of weekly stress, fatigue, DOMS, sleep, training monotony, training strain and ACWR between playing positions.

Measures (AU)	Defenders	Central Midfielders	Wide Midfielders	Strikers	F	P
Stress	12.1 ± 2.8	8.9 ± 1.1	10.7 ± 1.2	9.8 ± 2.8	1.830	0.185
Fatigue	11.5 ± 2.2	9.9 ± 0.6	11.4 ± 1.8	10.7 ± 2.4	0.744	0.542
DOMS	9.7 ± 2.2	9.2 ± 2.2	11.2 ± 2.4	9.7 ± 2.7	0.513	0.680
Sleep	12.9 ± 1.5	12.6 ± 0.9	11.9 ± 1.1	12.2 ± 1.3	0.589	0.632
TM	4.3 ± 0.6	4.6 ± 1.0	4.9 ± 0.3	4.4 ± 0.9	0.394	0.759
TS	82.3 ± 9.3	176.4 ± 167.2	125.9 ± 66.4	199.2 ± 258.3	0.518	0.676
ACWR	0.97 ± 0.02	0.97 ± 0.03	0.96 ± 0.01	0.98 ± 0.03	0.240	0.867

Abbreviations: AU, arbitrary units; DOMS, delayed onset muscle soreness; TM, training monotony; TS, training strain; ACWR, acute:chronic workload ratio.
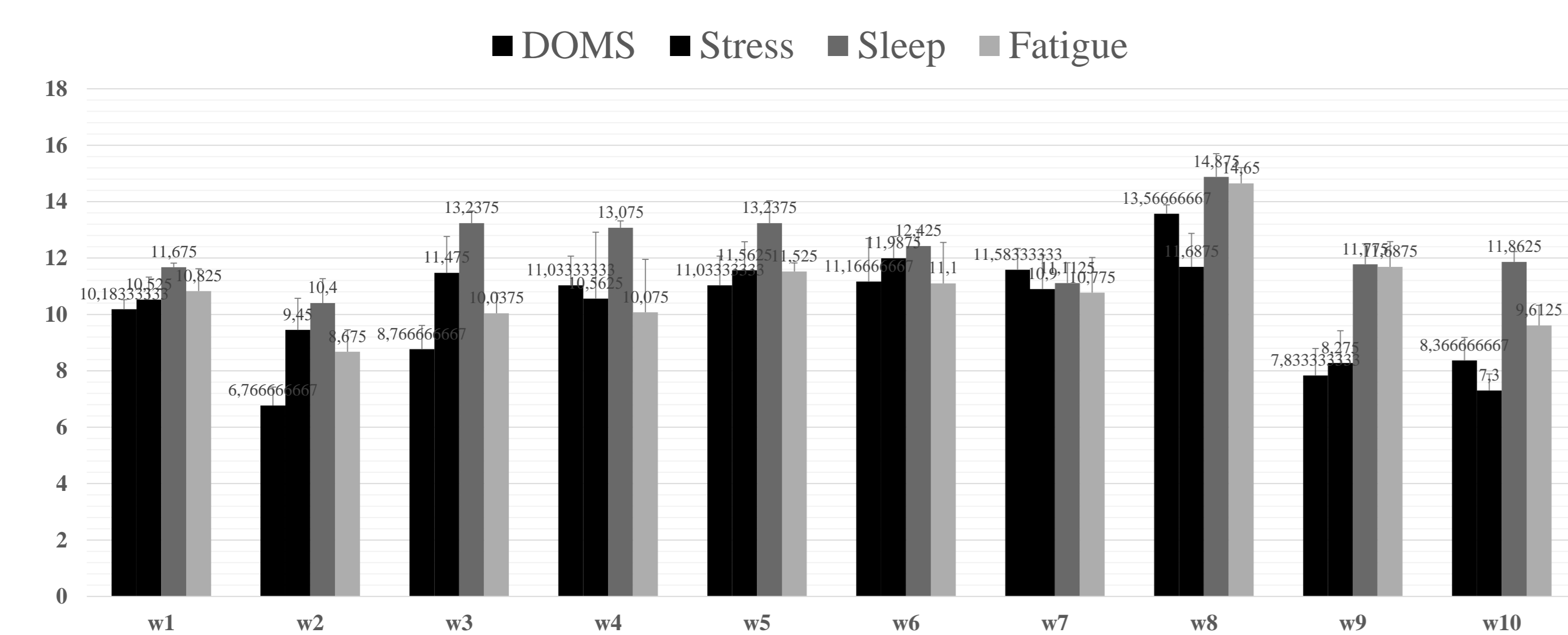
Figure 1: Description of weekly DOMS, stress, sleep and fatigue during the 10 weeks in AU (arbitrary units).
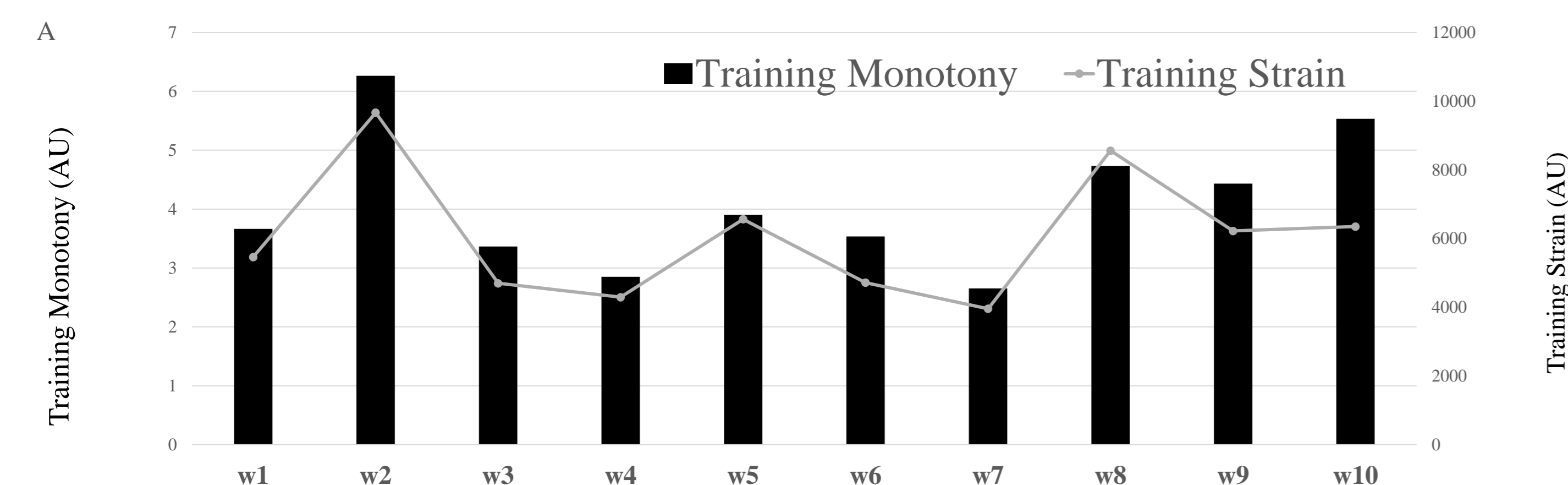
Figure 2: Description of training monotony and training strain during the 10 weeks.

METHODS

- Nineteen players (24.1±2.7 years) from a Portuguese BPI League professional team participated in this study. the playing positions were divided in 5 defenders, 5 central midfielders, 4 wide midfielders and 5 strikers.
- All variables were collected in a 10-week in-season period with 3 training sessions and 1 match per week during the 2019/20 season.

Table 1: Training sessions during the 10-week period.

Weeks (w)	w1	w2	w3	w4	w5	w6	w7	w8	w9	w10
Session duration (total minutes)	385	250	294	285	317	280	274	316	331	270

- **Internal Training Load Quantification** - 30 minutes after the end of each training session, players rated their RPE value using an app. The scores provided by the players were then multiplied by the training duration to obtain the s-RPE.
- **Wellness quantification** - Approximately 30 minutes before each training session, each player was asked to provide the Hooper Index (HI) scores using an app. This index includes four categories: fatigue, stress, muscle soreness (scale of 1–7, in which 1 is very, very low and 7 is very, very high), and quality of sleep of the night that preceded the evaluation (scale of 1–7, in which 1 is very, very bad and 7 is very, very good).

RESULTS

Considering the overall team, the results showed that there were some associations between Hooper Index categories and s-RPE like stress or fatigue (0.693, p<0.01), stress or DOMS (0.593, p<0.01), stress or s-RPE (-0.516, p<0.05) and fatigue or DOMS (0.688, p<0.01).

DISCUSSION AND CONCLUSIONS

There were no differences between all parameters in playing positions or player status. In conclusion, the study revealed that higher levels of fatigue and DOMS occurs concurrently with better nights of sleep. Moreover, any in-season variations concerning internal load and perceived wellness seems independent of position or status in outfield players. Also, the data showed that the higher the players' reported stress, the lower the observed s-RPE, thus possible indicating a mutual interference of experienced stress levels on the assimilation of training intensity by women elite soccer players.

Keywords: Training monotony, Training strain, Well-being, Female, Soccer

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