Exploring Inertial Movement Demands in Training and Matches in Collegiate Women's Soccer Conference Season

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INTRODUCTION

Soccer is characterized by repeated explosive efforts followed by low intensity recovery efforts. Technological advancements permit researchers to quantify these physical demands, allowing the assessment of player demands in training and matches. This evaluation can ascertain if players are achieving match-realistic demands in training sessions (TS). Little research has compared the physical demands in TS versus matches; however, recent investigations in male national level and professional female players showed high intensity variables (absolute and relative to activity duration) were significantly different in matches versus TS across a mesocycle.[1,2] To our knowledge, no research using inertial movement analysis (IMA) acceleration (ACC), deceleration (DEC) and IMA change of direction (COD) to compare physical demands in training compared to matches in NCAA DII women's soccer.

Purpose

The aim of this study was to explore differences in demands measured with IMA, including ACC, DEC, and COD counts in TS versus matches during conference play in NCAA DII women's soccer. We expect matches to have greater demands than TS.

METHODS

Data were collected from 6 field players (age 20±2.2 yrs, height 65.7±2 in) from the university women's soccer team throughout the 2024 season. Players consisted of defenders (n=3) and forwards (n=3). Data was extracted from 7 matches and 16 TS that were live tracked. Players must have participated in >60% of total match minutes and >60% of the TS within the mesocycle. All other players were excluded. IMA demands were collected via Catapult S7® sensors. The data were retrieved from Openfield® Cloud 4.7 and summarized in Excel®. High-intensity, medium-intensity, and low-intensity counts were extracted for IMA ACC, IMA DEC, IMA COD-right (COD-R), and IMA COD-left (COD-L). Descriptive analysis was performed for each intensity band for each variable. High- and medium-intensity bands (HM) were combined to compare IMA demands in TS versus games. Low intensity IMA demands were examined separately. Descriptive and inferential statistics were completed in Jamovi 2.3.28.0. Normality was assessed using the Shapiro-Wilk test.

REFERENCES

1. García-Ceberino, JM, et al. https://doi.org/10.3390/s22082870
2. Oliva-Lozano, JM, et al. PMID: 33312307

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RESULTS

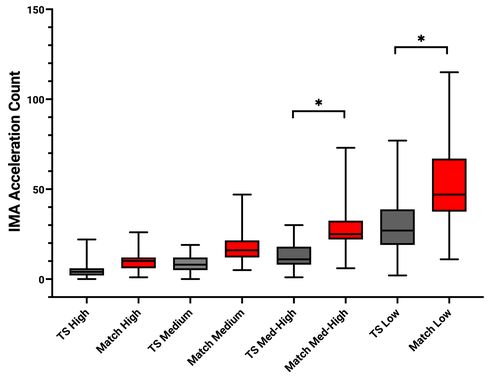

Figure 1. Each box plot represents the median and IQR for IMA acceleration counts. *p>0.001

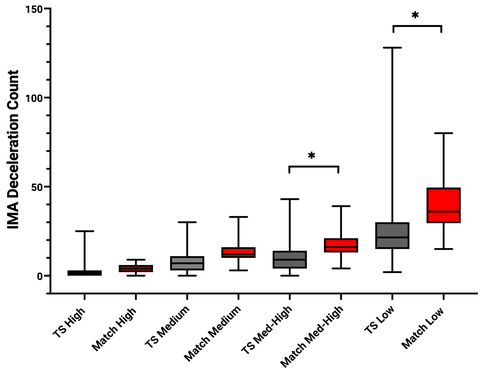

Figure 2. Each box plot represents the median and IQR for IMA deceleration counts. *p>0.001

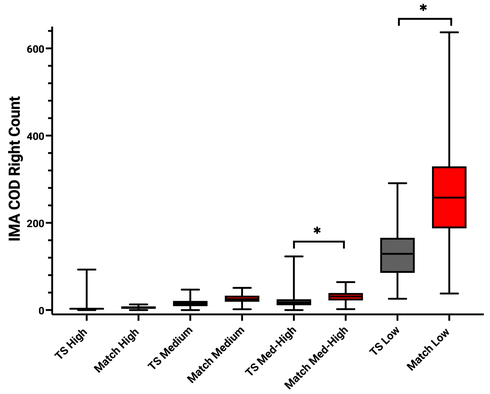

Figure 3. Each box plot represents the median and IQR for IMA Change of Direction Right counts. *p>0.001

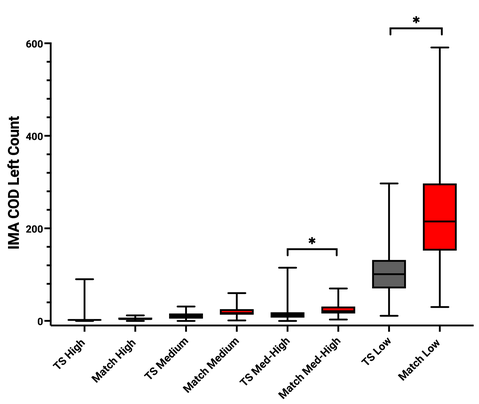

Figure 4. Each box plot represents the median and IQR for IMA Change of Direction Left counts. *p>0.001

RESULTS

The Shapiro-Wilk test was significant for all measured variables and the Mann-Whitney U test was used for the inferential analysis. Results are shown in Table 1.

Table 1. Median (IQR) Acceleration, Deceleration, and Change of Direction Counts

Variable	Category	Training Session	Match
ACC Counts	Low	27.9 (19.3)	47 (28)[a]
	Med	8 (7)	16 (9)
	High	4 (4)	10 (6)
	MH	11 (10)	25 (10)[a]
DEC Counts	Low	21.5 (15)	36 (19)[a]
	Med	7 (8)	12 (6)
	High	1.5 (3)	4 (4)
	MH	9 (10)	16 (8)[a]
COD-R Counts	Low	129 (77.5)	258 (133)[a]
	Med	15 (12)	25 (14)
	High	3 (3.25)	5 (5)
	MH	17.5 (13.3)	31 (16)[a]
COD-L Counts	Low	101 (58.5)	215 (133)[a]
	Med	10.5 (11)	17 (11)
	High	2 (2)	4 (4)
	MH	13 (11.3)	21 (15)[a]

[a]p>0.001

CONCLUSIONS

IMA ACC, DEC, COD-R, and COD-L were significantly higher in matches than TS in both combined HM bands and low intensity bands. These findings are similar to previous investigations using high intensity measures and now extend this work to medium and low intensity measures.

PRACTICAL APPLICATIONS

Our observations give practitioners insight on differences in physical demands in TS and matches. Due to the nature of the sport, practitioners should consider the impact of low and medium-intensity efforts to overall load accumulation. This may allow practitioners to design TS to reflect match-like demands and provide benchmarks following injury.

CONTACT

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