In-Season Match Demands Of Men’s Collegiate Soccer: A Comparison By Half, Position, Match Outcome, Match Location, And Competition Phase

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ABSTRACT

The purpose of this study was to quantify athlete external workload by half, position, match outcome, match location, and competition phase (e.g., conference vs non-conference) during match play across a men’s NCAA DIII soccer season. Throughout the competitive season, 16 soccer players wore a GPS device in 17 matches. Workload metrics collected were: total distance (TD), distance per minute (D/min), distance in speed zones (SZ) 1-5, sprint efforts, sprint distance (SD), top speed, accelerations, player load (PL), and player load per minute (PL/min). TD (4164±1235 m), PL (169±52 AU) D/min (116±20 m/min), PL/min (4.7±0.8 AU), SD (80±55 m), accelerations (32±14), decelerations (35±14), PP (30±10), SZ2 (1520±469 m), and SZ3 (582±222 m) were significantly higher in the 1st half of play. Forwards demonstrated significantly higher top speeds (9.5±2.0 m/s) than midfielders (8.0±1.1 m/s) and defenders (7.7±1.2 m/s). PL (309.45±83.86 AU), D/min (216.82±59.26 m/min), PL/min (8.76±2.26 AU/min), top speed (15.82±3.41 m/s), SZ3 (1059.45±403.27 m) and SZ4 (139.52±75.78 m) were significantly greater in matches that resulted in wins. However, SZ5 (20.59±23 m) was significantly greater during matches that resulted in losses. PL (321.73±93.38 AU), D/min (229.26±74.58 m/min), PL/min (9.24±2.84 AU/min), top speed (16.03±4.43 m/s), SZ2 (2819.48±891.09 m), SZ3 (1130.63±460.09 m), SZ4 (150.33±80.52 m) SZ5 (20.84±22.86 m) were significantly greater during home matches. PL (321.85±88.79 AU), D/min (228.2±64.66 m/min), PL/min (9.16±2.45 AU/min), SZ2 (2850.53±795.83 m), SZ3 (1145.27±456.34 m), and SZ4 (142.49±74.89 m), were significantly greater during nonconference matches. SZ5 (19.23±22.87 m) was significantly greater during conference matches. PL (321.73±93.38 AU), D/min (229.26±74.58 m/min), PL/min (9.24±2.84 AU/min), top speed (16.03±4.43 m/s), SZ2 (2819.48±891.09 m), SZ3 (1130.63±460.09 m), and SZ4 (150.33±80.52 m) were significantly greater in matches that resulted in wins. However, SZ5 (20.59±23 m) was significantly greater during matches that resulted in losses. PL (321.73±93.38 AU), D/min (229.26±74.58 m/min), PL/min (9.24±2.84 AU/min), top speed (16.03±4.43 m/s), SZ2 (2819.48±891.09 m), SZ3 (1130.63±460.09 m), SZ4 (150.33±80.52 m) SZ5 (20.84±22.86 m) were significantly greater during home matches. PL (321.85±88.79 AU), D/min (228.2±64.66 m/min), PL/min (9.16±2.45 AU/min), SZ2 (2850.53±795.83 m), SZ3 (1145.27±456.34 m), and SZ4 (142.49±74.89 m), were significantly greater during nonconference matches. SZ5 (19.23±22.87 m) was significantly greater during conference matches. Match workloads help coaches identify physical demands needed to compete. Tailoring training and monitoring accumulated fatigue will allow coaches to optimize team performance.

Keywords: GPS, athlete monitoring, sport science, external load, football
INTRODUCTION

Quantification of physical work performed during training and competition, commonly referred to as external load, is important to consider when designing and implementing programs for athletes. Global positioning systems (GPS) are a viable tool for monitoring and managing athlete loads in order to minimize injury risk and improve sport performance (Bourdon et al., 2017). Further, monitoring athlete external load can be used to manipulate volumes and intensities, inform coaching decisions, optimize recovery, and guide nutritional interventions (Jagim et al., 2020). Soccer is an intermittent, high-intensity sport, in which players are exposed to high volumes (e.g., total distance, player load) and intensities (e.g., high-speed running, sprints, jumps, change of direction, accelerations, and decelerations). External loads achieved during match play may vary depending upon a multitude of factors including: half, playing position, match outcome, match location, competition phase (e.g., conference vs non-conference), score margin, tactical objectives, pacing strategies, and playing time. National Collegiate Athletic Association (NCAA) soccer rules and seasonality structure differ from other levels of competition, therefore, match loads may differ from those reported at the professional level (Jagim et al., 2020). For example, NCAA soccer rules allow for re-entry following substitutions, include two 10-minute overtime periods with a “golden goal” applied, and incorporate clock stoppage for injuries, goals, and card issuance (Andres, 2021). There are also differences in regards to in-season scheduling, where NCAA soccer players can compete in over 25 matches during a 15-week season, with 2 matches per week, compared to European professional soccer players who may play multiple matches per week over a 45-week season (Carling et al., 2012; Lago-Peñas et al., 2011; Ranchordas et al., 2017).

Previous research in men’s professional soccer has demonstrated that physical performance declines in the second half of matches, specifically total distance and high-speed distance (Mohr et al., 2003, 2005). These observed performance decrements may be due to a multitude of physiological changes that occur over the course of a match, including glycogen depletion, increased core temperatures, dehydration (Mohr et al., 2005), pacing strategies, tactical changes, and mental fatigue (Bradley & Noakes, 2013; Paul et al., 2015). The reduction in load across half may also be attributed to score discrepancies and match outcome, such that loads may decrease when teams are winning and increase when teams are losing (Lago-Peñas, 2012). There are also known differences in positional demands as prior research has reported wide defenders and strikers produce the greatest high-speed running, sprinting, and high-intensity acceleration distances, compared to other positions (Abbott et al., 2018; Andrzejewski et al., 2015; Bloomfield et al., 2007; Di Salvo et al., 2007); however, positional workloads may also be affected by tactical formation (Calder & Gabbett, 2022). Match location may also influence external loads, as prior research has shown greater intensity efforts at home matches (Lago-Peñas, 2012; Oliva-Lozano et al., 2021). Lastly, loads may vary across competition phase, with a potential for higher volumes and intensities in conference matches as the level of competition may be greater with more at stake in regard to the outcome. Of importance, match outputs have been observed across a variety of professional levels, and results have shown that lower divisions often covered greater workloads, most likely due to lack of technical and tactical qualities compared to higher divisions (Bradley et al., 2013). Therefore, it is important to quantify match loads throughout a season across distinct levels of NCAA competition, as a collegiate season may provide a unique distribution and magnitude of external loads. In turn, this can help direct the specific programming and recovery needs for male collegiate soccer athletes.

While previous work has quantified match demands of NCAA Division I men’s and women’s soccer, (Bozzini et al., 2020; Curtis et al., 2018; McFadden et al., 2020), match demands of NCAA Division III (DIII) have not been established despite DIII totaling 410 of the 821 collegiate soccer programs in the United States. Therefore, the purpose of this study was to quantify the athlete external workload by half, position, match outcome, match location, and competition phase (e.g., conference vs non-conference) during match play across a men’s NCAA DIII soccer season.

METHODS

Participants

NCAA DIII men’s soccer players (n = 16, age range: 18-21 years) classified as “starters”, participated. Starters were defined as players who maintained a minimum playing time of 45 minutes per match. Goalkeepers and non-starters were excluded due to relatively low total distances travelled. Soccer athletes were under the direction of the same
Certified Strength and Conditioning Specialist® and were following a similar training regimen. All athletes completed a medical history form and were cleared for intercollegiate athletic participation. Risks and benefits were explained to athletes, and an institutionally approved written informed consent form was signed before participation. All procedures involving human subjects were conducted in accordance with the requirements of the Declaration of Helsinki and approved by the Springfield College Institutional Review Board for Human Subjects (IRB #3182021).

**Procedures**

Athlete external loads were collected over 10 weeks during the 2021 NCAA men's soccer season from "starters." External loads were collected during all in-season matches (n = 17). Information pertaining to match location, outcome and conference status was also recorded and used for later analysis.

**External Load**

External load was quantified during all matches using 10 Hz GPS/GNSS technology (PlayerTek, Catapult Sports, Melbourne, Australia). Previous work has reported that 10 Hz units provide a valid and reliable estimate of kinematic data with sufficient inter-unit reliability for comparisons between athletes (Johnston et al., 2014; Scott et al., 2016). GPS devices used a minimum of 3 satellites. All devices were activated 30 minutes before training to allow acquisition of satellite signals and synchronization of GPS clock with satellites atomic clock (Maddison & Ni Mhurchu, 2009). To promote reliability, players wore the same unit for each match/training session throughout the season (Buchheit et al., 2014). Devices were worn according to manufacturer guidelines in a supportive harness positioned between the scapulae (Coutts & Duffield, 2010).

External load metrics collected were: total distance (TD) (m), distance per minute (D/min) (m/min), distance in speed zones 1 (SZ1: 0-30% max speed), 2 (SZ2: 30-50% max speed), 3 (SZ3: 50-75% max speed), 4 (SZ4: 75-90% max speed), and 5 (SZ5: > 90% max speed ) , sprint distance (SD) (> 5 m/s1), top speed (m/s1), acceleration efforts (> 3 m/s2), deceleration efforts ( # > -3 m/s2) player load (PL) (AU) which is calculated as $\Sigma \sqrt{\text{instantaneous rate of change in acceleration in all 3 orthogonal planes}}$, and player load per minute (PL/min). Player load has been shown to be a valid and reliable measurement of total volume accrued during soccer training (Barrett et al., 2014). Additionally, maximal speed was determined for each player during preseason fitness tests and was continuously adjusted throughout the season if a player achieved a new higher speed. The use of individualized speed zones has been shown to provide more useful information regarding player velocity, especially when comparing different playing positions (Sánchez et al., 2017). Additionally, the use of individualized speed zones may be more useful when comparing higher speed zones (SZ4 and SZ5) across playing levels to modify zones based on physical abilities (Bradley & Vescovi, 2015).

Players were categorized by sport-position (forwards (n=3), midfielders (n=6), and defenders (n=7)). After each match, data were downloaded using the proprietary software, which automatically detects and removes any outlier data (Kumar et al., 2022).

**Statistical Analysis**

SPSS version 25.0 (IBM, Armonk, NY) was used for summary statistics. All values are presented as means ± SDs. Normality was assessed and non-normally distributed variables were log transformed for subsequent analyses. A multivariate analysis of variance (MANOVA) assessed differences in external load measures across halves, sport-position, match outcome, match location, and conference status (e.g., in-conference opponent, out-of-conference opponent) ($p < 0.05$). Bonferroni post hoc comparisons were calculated when a significant effect was identified. Partial eta² ($\eta^2$) effect sizes were calculated and interpreted as follows: small: 0.01-0.06; moderate: 0.06-0.14; and large: > 0.14.

**RESULTS**

A summary of external loads by half, sport-position, match outcome, match location, and conference status are presented in Table 1.
<table>
<thead>
<tr>
<th></th>
<th>TD (m)</th>
<th>PL (AU)</th>
<th>D/min (m/min)</th>
<th>PL/min (AU/min)</th>
<th>SD (m)</th>
<th>Top Speed (m/s)</th>
<th>Accel (# &gt; 3 m/s²)</th>
<th>Decel (# &gt; -3 m/s²)</th>
<th>PP (#)</th>
<th>SZ1 (m)</th>
<th>SZ2 (m)</th>
<th>SZ3 (m)</th>
<th>SZ4 (m)</th>
<th>SZ5 (m)</th>
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<td>97</td>
<td>311</td>
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<td>8.1</td>
<td>1.5</td>
<td>61 ± 28</td>
<td>62 ± 28</td>
<td>54 ± 21</td>
<td>3651</td>
<td>1334</td>
<td>2673</td>
<td>1069</td>
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<tr>
<td>(n=17)</td>
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<td></td>
<td>91</td>
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<td>93</td>
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<td></td>
<td></td>
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<tr>
<td>1st half</td>
<td>4164</td>
<td>52</td>
<td>116</td>
<td>4.7</td>
<td>80 ± 55</td>
<td>7.8</td>
<td>0.9</td>
<td>32 ± 14</td>
<td>35 ± 14</td>
<td>30 ± 10</td>
<td>1979</td>
<td>717</td>
<td>1520</td>
<td>582</td>
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<tr>
<td>2nd half</td>
<td>3686</td>
<td>58</td>
<td>97 ± 29</td>
<td>4.2 ± 1.0</td>
<td>74 ± 58</td>
<td>7.7 ± 1.1</td>
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<td></td>
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</tr>
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<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
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<tr>
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<td>0.008</td>
<td>0.034</td>
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<td>0.110</td>
<td>0.021</td>
<td>0.005</td>
<td>0.005</td>
<td>0.028</td>
<td>0.011</td>
<td>0.018</td>
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<tr>
<td>D (n=7)</td>
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<td>202</td>
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<td>7.7</td>
<td>1.2</td>
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<td>69 ± 28</td>
<td>53 ± 19</td>
<td>3862</td>
<td>1453</td>
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<td>M (n=6)</td>
<td>7727</td>
<td>44</td>
<td>211</td>
<td>4.3</td>
<td>162</td>
<td>8.0</td>
<td>1.1</td>
<td>61 ± 20</td>
<td>66 ± 24</td>
<td>53 ± 22</td>
<td>3740</td>
<td>1192</td>
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<td>F (n=3)</td>
<td>7302</td>
<td>91</td>
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<td>5.5</td>
<td>189</td>
<td>9.5</td>
<td>2.0</td>
<td>57 ± 23</td>
<td>69 ± 22</td>
<td>59 ± 19</td>
<td>3207</td>
<td>732</td>
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<td>0.034</td>
<td>0.023</td>
<td>0.015</td>
<td>0.110</td>
<td>0.021</td>
<td>0.005</td>
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<td>0.028</td>
<td>0.011</td>
<td>0.018</td>
<td>0.015</td>
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<tr>
<td>Win (n=10)</td>
<td>7620</td>
<td>1131.31</td>
<td>216.82</td>
<td>8.76 ± 3.41</td>
<td>157.35</td>
<td>15.82 ± 3.41</td>
<td>60.82 ± 21.94</td>
<td>66 ± 23</td>
<td>53.81 ± 19.08</td>
<td>3712.85 ± 1198.65</td>
<td>2688.41 ± 816.40</td>
<td>1059.45 ± 403.27</td>
<td>139.52 ± 75.78</td>
<td>17.81 ± 21.25</td>
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<tr>
<td>Loss (n=70)</td>
<td>8011</td>
<td>111.31</td>
<td>261.23</td>
<td>7.58 ± 4.45</td>
<td>174.74</td>
<td>14.59 ± 5.06</td>
<td>65.8 ± 26.43</td>
<td>72 ± 29</td>
<td>55.91 ± 21.32</td>
<td>3551.66 ± 1386.54</td>
<td>2486.53 ± 1098.86</td>
<td>966.24 ± 595.39</td>
<td>124.59 ± 88.40</td>
<td>20.59 ± 23.00</td>
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<td>0.429</td>
<td>0.535</td>
<td>0.741</td>
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<td>0.050</td>
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<td>0.092</td>
<td>0.102</td>
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<td>0.004</td>
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<td>0.003</td>
<td>0.001</td>
<td>0.008</td>
<td>0.025</td>
<td>0.053</td>
<td>0.049</td>
<td>0.117</td>
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</table>
Values are presented in mean ± standard deviation (n = 16)

**TD**: Total distance (m); **PL**: Player Load (AU); **D/min**: Distance per minute (m/min); **PL/min**: Player Load per minute (AU/min); **SD**: Sprint Distance (m); **Accel**: Accelerations (# > 3 m/s²); **Decel**: Decelerations (# > -3 m/s²); **PP**: Power Plays (#); **SZ**: speed zone; **SZ1**: 0-30% max speed, **SZ2**: 30-50% max speed, **SZ3**: 50-75% max speed, **SZ4**: 75-90% max speed, **SZ5**: > 90% max speed; **D**: defender; **M**: midfielder; **F**: forward; **C**: conference; **NC**: non-conference

**Halves**

Workload differences based on playing period are displayed in Table 1. The results of the multivariate analysis indicated that TD (p < 0.001, partial η² = 0.12), PL (p = 0.001, partial η² = 0.12), D/min (p < 0.001, partial η² = 0.09), PL/min (p < 0.001, partial η² = 0.11), SD (p < 0.001, partial η² = 0.05), accelerations (p < 0.001, partial η² = 0.11), decelerations (p < 0.001, partial η² = 0.10), PP (p < 0.001, partial η² = 0.08), and distances in SZ1 (p = 0.05, partial η² = 0.01), SZ2 (p = 0.001, partial η² = 0.09), and SZ3 (p = 0.005, partial η² = 0.05) were all significantly greater in the first half. No significant differences between halves existed in top speed, SZ4 and SZ5.

**Positions**

Positional workload differences are displayed in Table 1. The results of the multivariate analysis indicated that forwards demonstrated significantly higher top speeds than midfielders and defenders (p < 0.001, partial η² = 0.11). No significant positional differences existed in TD, PL, D/min, PL/min, SD, accelerations, decelerations, PP, and SZ1, SZ2, SZ3, SZ4, and SZ5.

**Match Outcome**

Differences in workload based on match outcomes are displayed in Table 1. The results of the multivariate analysis indicated that PL (p < 0.001, partial η² = 0.11), D/min (p < 0.001, partial η² = 0.092), PL/min (p < 0.001, partial η² = 0.102), top speed (p = 0.009, partial η² = 0.044), SZ3 (p = 0.004, partial η² = 0.044)}
0.053), SZ4 (p = 0.006, partial η² = 0.049) were higher in matches that resulted in wins. However, SZ5 (p < 0.001, partial η² = 0.117) was higher in matches that resulted in losses. No significant differences based on match outcome existed in TD, SD, accelerations, decelerations, PP, SZ1, and SZ2.

**Match Location**

Workload differences based on match location are displayed in Table 1. The results of the multivariate analysis indicated that PL (p<0.001, partial η² = 0.095), D/min (p<0.001, partial η² = 0.085), PL/min (p<0.001, partial η² = 0.087), top speed (p = 0.018, partial η² = 0.036), SZ2 (p = 0.004, partial η² = 0.054), SZ3 (p<0.001, partial η² = 0.071), SZ4 (p<0.001, partial η² = 0.078), and SZ5 (p = 0.001, partial η² = 0.068) were higher during home matches. No significant differences in match location existed in TD, SD, acceleration, deceleration, PP, and SZ1.

**Competition Phase**

Workload differences based on competition phase are displayed in Table 1. The results of the multivariate analysis indicated that PL (p = 0.002, partial η² = 0.061), D/min (p<0.001, partial η² = 0.069), PL/min (p = 0.002, partial η² = 0.061), SZ2 (p = 0.002, partial η² = 0.062), SZ3 (p<0.001, partial η² = 0.071), SZ4 (p = 0.034, partial η² = 0.029) were higher during non-conference matches. However, SZ5 (p = 0.004, partial η² = 0.052) was greater during conference matches. No significant differences existed between competition phase in TD, SD, top speed, acceleration, decelerations, PP, and SZ1.

**DISCUSSION**

This is the first study to examine match loads in NCAA DIII men’s soccer throughout an entire competitive season. The goals of the current study were to provide descriptive and quantifiable information about the physical match loads experienced by NCAA DIII men’s soccer players and how they may differ by half, playing position, match location, match outcome, and competition phase. The main findings were that external loads differed for all of the aforementioned parameters.

Previous reports of in-season external loads within collegiate men’s soccer are limited. In NCAA DI men soccer players, match TD ranged from 8064 – 9367 m,(current study: ~7654 m), with athletes covering ~287 m of SD (> 5.8 m/sec) (current study: ~160 m), ~930 AU of PL (current study: ~308), and ~121 high acceleration efforts (# > 3 m/s²) (current study: ~61) (Curtis et al., 2018; Fields et al., 2021; McFadden et al., 2020). Therefore, external loads at the DI level appear to be higher than those of DIII athletes in the current study. However, different GPS systems, in addition to varying sprint and acceleration zone thresholds, were used across studies (Curtis et al., 2018). These differences highlight a limitation in comparing workload between groups using different GPS systems and metrics. These subjective thresholds can potentially result in an under- or over-estimation of sprint distances, depending upon their individual physical attributes and thresholds used (Abbott et al., 2018). Further, the teams previously studied represented a higher division (DI versus DIII), thus the level of competition may influence workloads performed. However, it is important to note the rules of play and clock time are equivocal across the NCAA Division I, II and III levels.

In the current study, TD (+11.5%), PL (+10.7%), D/min (+16.4%), PL/min (+10.6%), accelerations (+22.1%), decelerations (+20%), and distances in SZ2 (+17.2%) and SZ3 (+12%) were higher in the first half of match play (See Table 1). Similar reductions have been observed in professional men’s soccer players, where TD, distance/min, PL/min, and medium-high intensity running significantly declined in the second half of match play (Di Salvo et al., 2007; Slater et al., 2018; Strauss et al., 2019). Several possible explanations might provide insight into why these decrements in workload occur, such as the accumulation of physical and mental fatigue (Barros et al., 2007; Di Salvo et al., 2009; Mohr et al., 2003; Rampinini et al., 2008), or if the score is heavily one-sided it may alter exertion levels and tactical strategies (Mohr et al., 2003). While no studies have examined such changes at the DIII level, it may be important to consider these contextual factors, while seeking strategies to attenuate reductions in second half match workloads.

Different activity profiles were evident among playing-position. Forwards (9.5 ± 2 m/s) recorded higher top speeds than midfielders (8.0 ± 1.1 m/s) and defenders (7.7 ± 1.2 m/s) but no differences were observed in the number of sprint efforts or sprint distance across position (See Table 1). These findings differ from previous research in professional soccer players, which reported that forwards are commonly involved in more high-speed running and sprinting activities during match play than other positions (Curtis et al., 2020; Di Salvo et al., 2009; Gonçalves...
The results from the current study demonstrate that PL (309.45 vs 261.23 AU), PL/min (8.76 vs 7.58 AU/min), top speed (15.82 vs 14.59 m/s), and distances in SZ3 (1059.45 vs 966.24 m) and SZ4 (139.52 vs 124.59 m) were greater in wins (n=10) compared to losses (n=7). However, distances in SZ5 (20.59 vs 17.81 m) were greater in losses (See Table 1). Limited attention has been paid to quantifying differences in loads by match outcome, but preliminary findings have demonstrated that professional soccer players perform significantly fewer high-intensity movement patterns during wins compared to losses (Bloomfield et al., 2005 Lago et al. 2010). This phenomenon suggests that players may assume a ball retention strategy when winning, resulting in a slower pace of play with attenuated speeds (Bloomfield et al., 2005 Lago et al. 2010). On the other hand, when losing, players may try to increase their physical outputs to gain ball possession to improve the likelihood of scoring. Other research found higher external loads in wins, but higher TD and high-speeds running distances in the second half of losses. (Nobari et al., 2021). This may be attributed to a closer score, which may be associated with various motivational implications, amongst other variables.

Match location appeared to influence differences in external loads as current results indicated PL (321.73 vs 258.69 AU), D/min (229.26 vs 180.79 m/min), PL/min (9.24 vs 7.32 AU/min), top speed (16.03 vs 14.64 m/s), and distances in SZs 2-5 (2819.48 vs 2389.03 m, 1130.63 vs 909.6 m, 150.33 vs 116.17 m, and 20.84 vs 16.67 m, respectively) were higher during home matches (n=9) compared to away matches (n=8) (See Table 1). Although data in regard to match location and external loads remain limited, current findings are in support of a prior study showing professional men’s soccer players covered greater TD at home matches. (Lago et al., 2009; Zubillaga et al., 2007). Home advantage in soccer is well-known and players may have taken advantage of the familiar crowd, playing surface, absence of travel, pride, and other psychological factors that may result in greater effort and more movement (Pollard, 2008). It is recommended that future studies investigate the effect of match location in collegiate-specific populations.

Lastly, PL (321.85 vs 272.43 AU), distance/min (228.2 vs 192.09 m/min), PL/min (9.16 vs 7.79 AU/min), and distances in SZs 2-4 (2850.53 vs 2463.83 m, 1145.27 vs 948.83 m, and 142.49 vs 128.61 m respectively) were higher during non-conference matches (n=7) than conference matches (n=10), while distances in SZ5 (19.23 vs 18.24 m) were higher during conference matches (See Table 1). These findings align with previous research in NCAA DI women’s

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References

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soccer players, where non-conference matches elicited greater training loads, TDs, and energy expenditures relative to conference play (Bozzini et al., 2020). Of important note, the first four matches of the season were played against non-conference opponents; therefore, it is likely players produced greater workloads because they had not experienced much accumulated fatigue from the upcoming season (Gualtieri et al., 2020). Another explanation for the greater workloads observed in non-conference play may be attributed to the higher frequency of player substitutions as players are competing for a starting spot on the roster (Bozzini et al., 2020). This aggressive play coupled with the potential for higher quality opponents, could potentially lead to the increased external loads observed in non-conference matches. Further exploration of such differences is warranted to ensure athletes are balancing progressive overload and recovery during accumulating in-season demands and conference play (Bozzini et al., 2020).

This study does not come without limitations. First, data was collected from one NCAA Division III men’s team in the northeast region and therefore may not be comparable to teams in other divisions or regions. Further, the small sample size (n=16) prevented additional positional classifications (i.e., central vs wide defenders). It’s also important to note that tactical decisions including formation and substitutions may have also influenced match demands. Lastly, the current study used Playertek GPS systems, which may differ from other GPS systems in its satellite recruitment and filtering threshold.

This is the first examination of external workload match demands in DIII men’s soccer players over the course of an entire season. Our results indicate that external loads were affected by half, position, match outcome, match location, and competition phase. Further research exploring interactions between contextual factors affecting external loads in competitive soccer is warranted. Such contextual variables, which result in changes in workload and performance, may be considered for more appropriate load prescriptions and improved programming for load management and periodization strategies during congested match schedules. Additionally, future research should consider examining accumulated fatigue and fluctuations in workload during training leading up to matches to optimize training without hindering match performance. Coaches may use this information to identify key performance indicators and tailor practice activities that will maximize their technical and physical performance for matches.

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