Title Page:

Variability of test match cricket and the effects of match location on physical demands in male seam bowlers

Authors:

Alex Bliss[1], Rob Ahmun[2], Hannah Jowitt[2], Phil Scott[2], Samuel Callaghan[1], Thomas W. Jones[3], Jamie Tallent[4,5]

Institution and Affiliation:

1: Centre for Applied Performance Sciences, St Mary's University, Twickenham, London, UK. 2: England and Wales Cricket Board. 3: Department of Sport Exercise and Rehabilitation, Northumbria University, Newcastle upon Tyne, UK. 4: Centre for Sports and Exercise Science, University of Essex, Colchester, United Kingdom. 5: Department of Physiotherapy, Faculty of Medicine, Nursing and Health Sciences, School of Primary and Allied Health Care, Monash University, Australia

Corresponding Author:

Alex Bliss alex.bliss@stmarys.ac.uk St Mary's University, Twickenham, London, TW1 4SX

Abstract Word Count: 199

Total Word Count: 4593

Tables: 2

Figures: 0

Disclosure Statement:

The Authors declare no competing interests

Manuscript

Abstract:

The physical demands of test match cricket in seam bowlers during fielding are currently unknown. Similarly, analysis of between-match variability and the effects of playing home vs. away is required. Nine international male seam bowlers across 28 test matches (n= 9 home; n= 19 away) were investigated over five years (2015-2019). Seam bowlers wore global positioning sensors during match play fielding to quantify physical demands. Absolute and relative (per hour) distances covered in five velocity bands, total distance, and number of accelerations and decelerations were assessed for each match. Coefficient of variation (CV%) and smallest worthwhile change were used to calculate between-match variability. Mixed linear modelling was used to analyse home vs away matches. Seam bowlers covered up to 50 km, with maximal durations of >21 hours during test match fielding. Small between-match CV% (8.3) were found for maximal velocity with large (CV% = 21-192) between-match variability across most other variables. Greater distances were covered at 15-20 $km \cdot h^{-1}$ ($p= 0.02$) and >25 $km \cdot h^{-1}$ ($p= 0.04$) when playing at home. The results demonstrated substantial, highly variable physical demands. Practitioners should adapt training retrospectively to the match demands encountered and should anticipate that match intensity may be higher during home matches.

Keywords:

Seam bowling, home vs. away, international, elite, variation,

Introduction:

Cricket matches are played in either multi-day or single day formats. In international cricket, the multi-day format is referred to as a “test match” and is played over a maximum of five consecutive days, with each team having two innings to compile a score greater than their opponent, and take twenty wickets to win. Regardless of match format, cricket players have primary roles (batting, seam or spin bowling, or a combination of batting and seam/spin bowling) they perform within match-play, while all players will field. Research into the physical demands of cricket has typically focused on seam bowlers, as they experience the greatest physical demands of all players (Petersen et al., 2009; Cooke et al., 2019; Vickery et al., 2016). However, little is known about physical demands of test matches for seam bowlers, particularly when compared to the shorter match formats (i.e. One Day International [ODI] and Twenty20 [T20] cricket), which are well established (Petersen et al., 2009; Bliss et al., 2021). The primary reason for this dearth of information on the physical demands of test match cricket is there are fewer test matches (approximately 10-15) played per year in comparison to T20 and ODI cricket (approximately 25-30), owing to their duration. Consequently, insights into the physical demands of test matches would provide valuable information to practitioners regarding the physical demand of this unique match format, which would help optimise physical preparation and recovery strategies for elite seam bowlers.

To date, no research has investigated the physical demands of test match cricket in seam bowlers. However, one research study has investigated the physical demands of fielding between international test match and four-day national state-level cricket (Petersen et al., 2011). Petersen and colleagues reported that international fielders during test match cricket covered a small to moderately greater distance across all movement categories and performed moderately more high-intensity movements, with less recovery time per hour than national state-level cricketers (Petersen et al. 2011). This research provided some insights into the physical demands of test match cricket; however, it was not specific to seam bowlers, who have consistently been shown to have the highest physical demands placed upon them during all forms of cricket (Petersen et al., 2010) Furthermore, while the investigation by Petersen and colleagues had 25 data points for test matches, this was only collected from three matches (Petersen et al., 2011). Due to the high variability in the physical demands of match-play which has been demonstrated in the short match formats (Bliss et al., 2021; Bray et al., 2016), it is likely that analysis of a larger data set of matches is necessary to acquire a better understanding of physical demands during test matches. This is of particular importance when contextual factors such as match conditions and the range of match scenarios experienced during test match cricket (which are likely to be more varied owing to increased match duration), are accounted for as these will influence the physical demands placed upon seam bowlers.

Specific research into the physical demands of test match cricket among seam bowlers is required to address the gaps in knowledge highlighted above. This will allow for training and recovery strategies to be developed that reflect the demands of test matches, particularly as the volume of distance covered, sprints completed, and overs bowled will likely be vastly different to shorter match formats. With limited research available from cricket, inference from other sports such as football and Australian football suggests that considerable variability is present in physical demands such as total sprint distance and high or very high speed running across a season (Gregson et al., 2010; Kempton et al., 2015; Carling et al., 2016). As cricket has high variability in physical demands in T20 and ODI cricket, and can be influenced by contextual factors such as match conditions (Bliss et al., 2021), an investigation of variability in test match cricket is warranted.

An additional gap in knowledge exists relating to test match cricket and the effects of match location on physical demand. In other sports such as professional football and basketball, match location has been shown to impact physical demands such as high-speed running distance and maximal acceleration (Oliva-Lozano et al., 2020), and total distance relative to time, with differences observed being attributed to variations in playing style between countries (Stojanovic et al., 2018). While athletes in these sports are not exposed to the same diverse geographic locations as frequently as international cricketers, the effect of match location is an important consideration for test matches. A recent study found that when compared to home matches (England and Wales), away matches were more physically demanding in a number of key performance metrics (Bliss et al., 2021) However, this was in ODI matches only. An investigation of physical demands and match location in test match cricket would offer useful information and provide evidence for the conditioning requirements for players.

The present study had three aims: 1) Investigate the physical demands of test match cricket for seam bowlers during fielding, 2) investigate the between-match variability of physical demands across test matches for seam bowlers, 3) investigate the effects of match location (home vs away) on physical demand in test matches for seam bowlers.

Methods and Materials:

Study Design and Participants:

A single-cohort, longitudinal observational design was used to investigate the physical demands and associated variability of test match cricket during fielding in seam bowlers. A further analysis of the effects of match location was also conducted. Nine international male seam bowlers (age= 32 ± 5.2 y, stature= 1.88 ± 0.08 m, body mass= 87.0 ± 6.3 kg) from 28 test matches (home n= 9; away n= 19) were involved in this five-year (2015-2019) retrospective analysis. Away matches were played in: Abu Dhabi (vs Pakistan), Australia, Bangladesh, India, New Zealand, South Africa, and the West Indies. The data set contained 54 individual player data points (home n= 21; away n= 33), which were used to establish the between-match variability in physical performance. The study obtained retrospective ethical approval through the University's Local Ethics Committee (reference: SMEC_2019-20_028) and was conducted in accordance with the Declaration of Helsinki.

Procedures:

During test matches, players wore a 10 Hz global positioning sensor (GPS) device (2015-2018 Catapult OptimEye S5 unit; 2018-2019 Catapult OptimEye G5, both Catapult Innovations, Melbourne, Australia) positioned on the upper back, housed in a fitted vest. The units also contained 100 Hz triaxial accelerometers (range of 3D ± 16 g), gyroscopes (range of 3D $2000°\cdot sec^{-1}$), and magnetometers. The S5 (Nicollela et al., 2018) and G5 (Barret et al., 2014) units have been shown to be reliable and valid and share the same componentry (Malone et al., 2017). Units were activated 15 minutes prior to each fielding session and data collected from the units were analysed once exported from Catapult's OpenField Cloud database. Only the period of fielding (including bowling) was analysed in this study. Non-fielding and bowling activities (e.g. warm up, batting) were removed from the analysis. For home compared to away analyses, individual match data were collected from all seam bowlers. For the analysis of match variability, data from all seam bowlers who performed in the match were collated and averaged to provide mean values. To be included in the analysis, players must have worn a GPS unit and have their fielding (comprising bowling and fielding activities) recorded for all time on the field during the entire match. Fielding sessions recorded via GPS were compared against a specialist cricket database (www.espncricinfo.com) to confirm timings and durations and to ensure no fielding was missed. The database was also used to report number of overs bowled in accordance with previous research (Bliss et al., 2021). All physical performance measures were represented as absolute and relative (per hour) values.

Based on previous literature (Bliss et al., 2021) and the standard procedures for the team's day-to-day operations, five velocity bands (0-7 km·h^{-1}; 7-15 km·h^{-1}; 15-20 km·h^{-1}; 20-25 km·h^{-1}; >25 km·h^{-1}) were used to quantify physical demands using distance covered in each band. Number of entries into pre-selected acceleration (2-4 m·s^{2}; >4 m·s^{2}), and deceleration (-2-4 m·s^{2}; <-4 m·s^{2}) bands were also used. Other variables analysed were maximal velocity, total distance covered and total duration of fielding, the latter being used to calculate the aforementioned relative measures.

Global positioning coordinates and altitude of the match location were obtained from Google Maps (Google LLC, California, USA). These data were used to obtain the corresponding number of satellites and horizontal dilution of precision (HDOP) statistics from a global position system website (www.gnssplanning.com Trimble Terrasat GmhH, Germany, Trimble Inc. v. 1.4.6.0) and are reported in line with recommendations on reporting standards for research utilising GPS technology (Malone et al., 2017).

Statistical Analysis:

Data are reported as mean ± SD, with maximal values for additional context. An alpha level <u><</u>0.05 was set *a priori*. Statistical analyses were performed in SPSS (IBM SPSS Statistics, v.27, IBM Corp.). All dependent variables were screened for normality using the Kolmogorov-Smirnov test and concomitant visual inspection of histograms and Q-Q plots. The following variables were not normally distributed and were transformed using the decadic logarithm prior to being entered into the mixed linear models: number of decelerations <-4 m·s^{2}; number of accelerations 2-4 m·s^{2} and >4 m·s^{2}; distance covered 7-15km·h^{1}. Variability was expressed using between-participant coefficient of variation (CV%) with 90% confidence intervals (CI). The smallest worthwhile change (SWC) was calculated from between-participant standard deviations (0.2*SD) for each dependent variable (Hopkins, 2004; Batterham & Hopkins, 2006). Mixed linear modelling (MLM) was conducted with match location (home or away) as a fixed factor and individual players as random factors. Match outcome was also controlled for by being entered into the model as a fixed factor. Five games were won at home (56 %), with one draw (11 %), and three losses (33 %). When away, there were three wins (16 %), four draws (21 %), and 12 (63 %) losses. Bonferroni *post-hoc* tests were used for pairwise comparisons where a significant location effect was observed.

Results:

Satellite data were as follows: Test Home: mean satellites available= 17 ± 2. HDOP= 0.71 ± 0.10 %. Test Away: mean satellites available= 16 ± 1 HDOP= 0.84 ± 0.60 %.

Physical Demands descriptive data and variability statistics for test matches are displayed in Table 1. Variability ranged from CV%= 8.3-157.2 for absolute and CV%= 14.8-192.0 for relative metrics, respectively. Outputs from the MLM are displayed in Table 2. There were no significant differences (p> 0.05) in absolute physical demands between home and away matches. However, seams bowlers covered a significantly greater distance per hour during home compared to away matches at velocities of 15-20 $km \cdot h^{-1}$ ($f_{(1,54)}$= 5.686. p= 0.021) and >25 $km \cdot h^{-1}$ ($f_{(1,54)}$= 4.689. p= 0.035). Bonferroni *post hoc* pairwise comparisons revealed that, per hour played, greater distances were covered at home when compared to away matches in the 15-20 $km \cdot h^{-1}$ (19% higher [CI= 8-30 %]) and >25 $km \cdot h^{-1}$ (150% higher [CI= 44-256 %) velocity bands.

INSERT TABLE 1 ABOUT HERE

INSERT TABLE 2 ABOUT HERE

Discussion:

The aims of this study were to investigate the physical demands of fielding and the between-match variability of seam bowlers during test matches. A further aim was to compare the physical demands of seam bowlers between home and away test matches. The main findings were that seam bowlers experience considerable physical demands across a range of performance metrics, particularly total duration of fielding and total distances covered in test matches. Seam bowlers performing in test match cricket also experience substantial variability (8-192%) across all absolute and relative variables studied. Additionally, seam bowlers perform more distance per hour in the 15-20 $km \cdot h^{-1}$ and >25 $km \cdot h^{-1}$ velocity bands when at home.

To date, this is the first investigation of the physical demands of seam bowlers during test match cricket. The results demonstrated that seam bowlers can cover vast absolute total distances during a match, while the hourly demands are less than those previously reported in four-day national level cricket (Petersen, Pyne, Portus et al., 2010; Petersen, Pyne, Dawson et al., 2011). In comparison to the previous research of Petersen et al., (2010 & 2011) it appears that the shorter match format of four-day national level multi-day cricket requires a greater distance in both low- and high-intensity movement bands to be covered per hour by seam bowlers, respectively. As previously reported, the shortest match format (T20) results in greater intensity (per hour) of physical demands for seam bowlers when compared to longer (one-day and multi-day) match formats. However, it is important to note that previous research into the physical demands of four-day national level cricket utilised different movement velocity bands and was conducted in Australia where playing conditions will vary to that primarily analysed within the current investigation. These differences may also explain that non-bowling fielders in previous studies have demonstrated higher physical demands than those present for the seam bowlers within the current investigation (Petersen et al., 2011). Nonetheless, valuable information regarding the physical demands of test match cricket for seam bowlers can be gathered from the current investigation, particularly regarding the absolute physical demands, which could be utilised to better prepare seam bowlers for the demands of test match cricket.

This study has also demonstrated that the physical demands of test match cricket are highly variable across all investigated metrics (CV%= 21-192), except maximal velocity (CV%= 8). Some of the variability in this study can be explained by the inherent variability present in test match cricket with fielding time showing a large CV% of 25. However, lower variability was observed for all intensity (per hour) metrics (except the number of accelerations >4 m·s^2 and decelerations <-4 m·s^2), although CV% were still 15-98. Previous research has shown that there is considerable variability with high-intensity actions, such as hard accelerations and decelerations and very high-speed running, and they are the least predictable across a range of sports (Vickery et al., 2016; Cunningham et al., 2016; Harper et al., 2019). In cricket, there appears to be a high degree of variability in physical demands, irrespective of match format. In T20 cricket, Bray et al. (2016) reported that high-speed running distance, total sprint distance, and total number of sprints had between-match variability of 33, 49 and 48%, respectively. Sholto-Douglas et al. (2020) reported similar findings in T20 Big Bash League cricket and, although slightly different velocity bands were used here, it appears a similar level of variability was also demonstrated. However, other metrics presented here show considerably higher variability, notably the frequency of hard accelerations (per hour) and absolute distance covered in the >25 km·h^{-1} velocity band which had between-match variability of 192% and 110%, respectively. These findings suggest that sport science staff will be required to prepare their seam bowlers for, and recover them from, a wide range of test match physical demands.

The data herein also suggest that match intensity was greater when the team played at home. Seam bowlers performed greater distances in the 15-20 km·h^{-1} and >25 km·h^{-1} velocity bands when competing at home, relative to time played. In the only other analysis of this type in cricket, it was demonstrated that away matches were longer and players covered greater distances in ODI cricket, but when investigated relative to time, only the number of moderate intensity decelerations were greater when playing away (Bliss et al., 2021). However, match outcome was not controlled for as the effect of playing away for a ODI is not as influential as it is in test matches. Owing to the home team's familiarity to playing and pitch conditions, and the duration of test matches, it is likely match location would be more influential upon the outcome of a test match than a shorter format. The findings from this study suggest that the frequency of actions in the 25 $km \cdot h^{-1}$ and 15-20 $km \cdot h^{-1}$ is greater at home. Speculatively, this may be explained by the mean fielding duration being approximately 100 minutes shorter when at home. If matches are shorter, more wickets will be taken and the number of delays in match-play will therefore be increased, meaning fielders can recover within a session and are able to perform high-intensity actions more frequently. Training for, and recovery from match play will therefore need to be modifiable and reflect the differences in physical demand, particularly the intensity of matches when playing at home or away.

Practical Implications:

These data demonstrate the considerable physical demands associated when fielding in seam bowlers in test match cricket. Until now, these demands were unreported in the scientific literature. Given the long total durations of fielding across a test match, and the large distances covered by seam bowlers, practitioners will be required to not only condition their seam bowlers to cope with these physical demands, but also ensure players have the opportunity for optimal recovery between matches. The findings of this study demonstrate that this is a complex task as not only are there high physical demands but these are coupled with extreme match-to-match variability in many of the physical demand metrics, particularly those involving high-intensity sprinting, acceleration, and deceleration. Sport science staff who are supporting test cricket seam bowlers will need to be flexible and pragmatic as they will likely be required to adapt their training and recovery strategies retrospectively to the demands of the match.

An additional finding from the data presented here is that practitioners supporting seam bowlers should anticipate that match intensity may be higher at home. Relative, per hour fielding data demonstrated that seam bowlers covered greater distances in the 15-20 $km \cdot h^{-1}$ and >25 $km \cdot h^{-1}$ velocity bands when playing at home compared to away. The location of a match will therefore have an influence on the training strategies used when preparing for, and recovering from, test matches. As this is the first study of its type to provide insight into the physical demands, variability, and effects of match location on fielding in seam bowlers during test matches, future research may seek to compare and contrast these findings from other test match playing nations. Practitioners working in elite, international cricket will likely have access to similar datasets. Collaborating with research partners will encourage an increased reporting of these data in the scientific literature, allowing for more informed physical training and recovery strategies to be implemented with test match seam bowlers.

Conclusion:

This is the first study to examine the physical demands of test match cricket in seam bowlers, demonstrating the extreme physical demands they are exposed to. Seam bowlers can cover vast distances over extended durations when fielding. These data also show the extreme between-match variability in physical demand with greatest variability shown in the number of intense accelerations and decelerations, and high-speed running distance. Though slightly reduced when the running metrics were expressed per hour of fielding, the physical demands of test matches are highly unpredictable. Finally, the intensity of home matches appeared to be higher.

Greater distances were covered per hour in the 15-20 and >25 km·h^{-1} velocity bands while total match fielding duration was ~100 minutes shorter at home.

Acknowledgements:

No financial support was obtained for this research.

References:

1. Barrett, S., Midgley, A., & Lovell, R. (2014). PlayerLoad: reliability, convergent validity, and influence of unit position during treadmill running. *International Journal of Sports Physiology and Performance*. 9(6): 945-52.
2. Batterham, A., Hopkins, W. (2006). Making meaningful inferences about magnitudes. *International Journal of Sports Physiology and Performance*. 1(1): 50-57.
3. Bliss, A., Ahmun, R., Jowitt, H., Scott, P., Jones, T., & Tallent, J. (2021). Variability and physical demands of international seam bowlers in one-day and Twenty20 international matches across five years. *Journal of Science and Medicine in Sport*. 24(5):505-510
4. Bray, J., Fogarty, M., Barrett, S., Lovell, R., & Abt, G. (2016). Using microtechnology to evaluate the between and within-match variability of professional Twenty20 cricket fast bowlers. *Professional Strength and Conditioning Journal.* 43: 19-26
5. Carling, C., Bradley, P., McCall, A., & Dupont, G. (2016). Match-to-match variability in high-speed running activity in a professional soccer team. *Journal of Sports Sciences.* 34(24): 2215-2223
6. Cooke, K., Outram, T., Brandon, R. Waldron, M., Vickery, W., Keenan, J., & Tallent, J. (2019). The Difference in Neuromuscular Fatigue and Workload During Competition and Training in Elite Cricketers. *International Journal of Sports Physiology and Performance*. 14(4): 439-444
7. Cunningham, D., Shearer, D., Drawer, S., Pollard, B., Eager, R., Taylor, N., Cook, C., & Kilduff, L. (2016). Movement demands of elite under-20s and senior international rugby union players. *Plos One. (11):* e0164990. doi:10.1371/journal.pone.0164990

8. Gregson, W., Drust, B., Atkinson, G.. & Salvo, V. (2010). Match-to-match variability of high-speed activities in premier league soccer. *International Journal of Sports Medicine.* 31: 237–242. doi:10.1055/s-0030-1247546
9. Harper, D., Carling, C., & Kiely J. (2019). High-intensity acceleration and deceleration demands in elite team sports competitive match play. a systematic review and meta-analysis of observational studies. *Sports Medicine*. 49: 1923-1947
10. Hopkins, W. (2004). How to interpret changes in an athletic performance test. *Sportscience*. 8: 1-7
11. Kempton, T., Sullivan, C., Bilsborough, J., Cordy, J., & Coutts, A. (2015). match-to-match variation in physical activity and technical skill measures in professional Australian Football. *Journal of Science and Medicine in Sport*. 18(1): 109-113
12. Malone, J., Lovell, R., Varley, M., & Coutts, A. (2017). Unpacking the black box: applications and considerations for using GPS devices in sport. *International Journal of Sports Physiology and Performance*. 12(S2-18 S2-26) http://dx.doi.org/10.1123/ijspp.2016-0236
13. Nicolella, D., Torres-Ronda, L., Saylor, K. & Schelling, X. (2018). Validity and reliability of an accelerometer-based player tracking device. *PLoS ONE*. 13(2): e0191823.
14. Oliva-Lozano, J., Rojas-Valverde, D., Gómez-Carmona, C., Fortes, V., & Pino-Ortega, J. (2020). Impact of contextual variables on the representative external load profile of Spanish professional soccer match-play: a full season study. *European Journal of Sports Sciences.* DOI: 10.1080/17461391.2020.1751305
15. Petersen, C., Pyne, D., Dawson, B. Portus, M., & Kellett, A. (2010). Movement patterns in cricket vary by both position and game format. *Journal of Sports Sciences*. 28(1): 45-52

16. Petersen, C., Pyne, D., Portus, M. & Dawson, B. (2009). Variability in movement patterns during one day internationals by a cricket fast bowler. *International Journal of Sports Physiology and Performance*. 4: 278-281

17. Petersen, C., Pyne, D., Portus, M., & Dawson, B. (2011). Comparison of player movement patterns between 1-day and test cricket. *Journal of Strength and Conditioning Research*. 25(5): 1368-1373

18. Sholto-Douglas, R., Cook, R., Wilkie, M., & Christie, C. (2020). Movement demands of an elite cricket seam during the Big Bash League in Australia. *Journal of Sports Science and Medicine*. 19: 59-64

19. Stojanovic, E., Stojiljkovic, N., Scanalan, A., Dalbo, V., Berkelmans, D., & Milanovic, Z. (2018). The activity demands and physiological responses encountered during basketball match-play: a systematic review. *Sports Medicine*. 48: 111-135

20. Vickery, W., Duffield, R., Crowther, R., Beakley, D., Blanch, P., & Dascombe, B. (2016). Comparison of the physical and technical demands of cricket players during training and match-play. *Journal of Strength and Conditioning Research*. 32(3): 821–829

Table 1: Descriptive Data (mean ± standard deviation) and variability statistics for test matches from 2015-2019.

Variable	**Absolute Physical Performance** **Test Match** **n = 28** (max value)	**Between match CV%** (± 90% CI)	**SWC**	**Relative Physical Performance (per hour)** **Test Match** **n = 28** (max value)	**Between match CV%** (± 90% CI)	**SWC**
Decelerations <-4 m·s^2 (n)	5.6 ± 3.3 (14.0)	57.8 (48.7, 71.0)	0.7	0.5 ± 0.3 (1.6)	71.2 (57.9, 92.4)	0.1
Decelerations -2-4 m·s^2 (n)	98.5 ± 43.8 (204.0)	44.4 (38.9, 51.8)	8.8	7.4 ± 2.5 (12.4)	34.1 (30.7, 38.2)	0.5
Accelerations 2-4 m·s^2 (n)	77.2 ± 54.9 (294.0)	71.5 (57.9, 92.3)	11.0	5.9 ± 3.7 (17.9)	63.5 (52.7, 79.8)	0.7
Accelerations >4 m·s^2 (n)	9.7 ± 15.2 (79.0)	157.2 (104.4, 318.3)	3.0	0.8 ± 1.5 (8.0)	192.0 (118.7, 502.8)	0.3
Total Distance (m)	34486.6 ± 9104.2 (49855.2)	26.4 (24.3, 28.9)	1820.8	2620.7 ± 438.7 (3446.8)	16.7 (15.9, 17.7)	87.7
Distance 0-7 km·h^{-1} (m)	25144.4 ± 6396.3 (35783.6)	25.4 (23.5, 27.7)	1279.3	1904.5 ± 281.2 (2394.0)	14.8 (14.1, 15.5)	56.2
Distance 7-15 km·h^{-1} (m)	4497.3 ± 1683.2 (8440.5)	37.4 (33.4, 42.6)	336.6	349.7 ± 124.1 (566.7)	35.5 (31.8, 40.1)	24.8
Distance 15-20 km·h^{-1} (m)	1528.8 ± 452.6 (2742.9)	29.6 (27.0, 32.7)	90.5	116.4 ± 24.1 (182.7)	20.7 (19.4, 22.2)	4.8
Distance 20-25 km·h^{-1} (m)	3060.3 ± 1118.8 (5222.2)	36.6 (32.7, 41.4)	223.8	231.3 ± 62.9 (354.9)	27.2 (25.0, 29.8)	12.6
Distance >25 km·h^{-1} (m)	247.4 ± 272.1 (1212.1)	110.0 (81.2, 170.2)	54.4	18.2 ± 17.7 (76.4)	97.5 (74.2, 142.1)	1.5
Maximum Velocity (km·h^{-1})	31.2 ± 2.6 (38.6)	8.3 (8.1, 8.5)	0.5			
Overs	31 ± 11 (54)	36.1 (32.3, 40.8)	2.0			
Duration (mins)	799 ± 203 (1283)	25.4 (23.5, 27.6)	41.0			

CV%= coefficient of variation. CI= confidence interval. SWC= smallest worthwhile change.

Table 2: Mixed linear model outputs for test match location and physical demands from 2015-2019.

	Absolute				**Relative (per hour)**			
	Home (n= 21)	**Away (n= 33)**			**Home (n= 21)**	**Away (n= 33)**		
Variable	Mean ± SD	Mean ± SD	$F_{(1,54)}=$	$p=$	Mean ± SD	Mean ± SD	$F_{(1,54)}=$	$p=$
Decelerations <-4 m·s^2 (n) (log)	0.71 ± 0.35	0.60 ± 0.38	0.996	0.323	0.06 ± 0.04	0.04 ± 0.03	2.122	0.151
Decelerations -2-4 m·s^2 (n)	95.52 ± 46.74	97.67 ± 58.48	0.697	0.408	7.81 ± 2.90	7.00 ± 3.67	2.457	0.123
Accelerations 2-4 m·s^2 (n) (log)	1.99 ± 0.46	2.15 ± 0.56	0.808	0.373	0.17 ± 0.06	0.16 ± 0.49	0.020	0.888
Accelerations >4 m·s^2 (n) (log)	0.72 ± 0.71	0.69 ± 0.44	0.061	0.806	1.51 ± 3.45	0.54 ± 0.61	0.906	0.345
Total Distance (m)	34506.20 ± 11690. 78	35174.35 ± 8976.37	0.045	0.834	2824.81 ± 516.31	2574.16 ± 544.95	1.811	0.184
Distance 0-7 km·h^{-1} (m)	24211.92 ± 7772.42	26075.12 ± 6157.64	0.092	0.763	1977.34 ± 304.87	1910.23 ± 376.09	0.437	0.512
Distance 7-15 km·h^{-1} (m) (log)	3.66 ± 0.22	3.60 ± 0.20	0.572	0.453	0.33 ± 0.11	0.27 ± 0.05	2.176	0.146
Distance 15-20 km·h^{-1} (m)	1579.03 ± 505.77	1516.63 ± 453.49	0.853	0.360	**130.98 ± 29.14**	**110.10 ± 24.28**	**5.686**	**0.021**
Distance 20-25 km·h^{-1} (m)	3098.44 ± 1145.6	2985.94 ± 1292.26	0.346	0.559	255.65 ± 65.43	215.61 ± 81.94	2.273	0.138
Distance >25 km·h^{-1} (m)	457.98 ± 732.47	181.44 ± 130.71	3.841	0.055	**33.47 ± 47.66**	**13.39 ± 9.08**	**4.689**	**0.035**
Maximum Velocity (km·h^{-1})	31.15 ± 1.86	30.86 ± 2.07	0.353	0.555				
Overs	31 ± 11	30 ± 12	1.185	0.281				
Duration (mins)	732 ± 202	828 ± 173	0.985	0.325				

Significant (p <0.05) differences are highlighted in bold text