The Match-Play Demands of Hurling

3 years in the making

Dr. Damien Young

Examination Paper

The Match-Play Demands of Hurling

You are required to answer **ALL** of the following questions

Time: 70 min

DURATION DEMANDS

Q1. How much time is the ball-in-play?

Q2. What is the frequency of ball-in-play?

STOPPAGES

Q3. What are the most frequent stoppages in hurling?

Q4. What are the duration of those stoppages?

The Match-Play Demands of Hurling

PHYSICAL DEMANDS

Q5. What are the running demands of the full game?

Q6. What positions are the most demanding?

Q7. What is the difference between the demands of the 1st and 2nd half?

Q8. What is a maximal intensity period?

Sport Sciences for Health
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ORIGINAL ARTICLE

The match-play activity cycles in elite U17, U21 and senior hurling competitive games

Damien Young[1] · Kieran Collins[2,3] · Laurent Mourot[1,4,5] · Giuseppe Coratella[6]

Received: 18 October 2018 / Accepted: 26 December 2018

Abstract

Purpose The current study aimed to investigate the ball-in-play (BIP) and ball-out-of-play (BOP) differences between U17, U21 and senior hurling matches.

Methods Video recordings of matches ($n = 36$) were coded and analysed for BIP and BOP. Time when the ball was continuously in-play was considered BIP, whereas any stoppages were considered BOP.

Results The total and mean BIP cycle duration showed no difference between levels. The number of BIP cycles were higher in senior matches compared to U17 (ES = 1.80: large) and U21 (ES = 1.27: large). U17 matches had a lower frequency of BIP cycles between 16 and 30 s (ES = − 1.75: large) compared to senior. Total BOP duration was longer in senior (45:30 ± 4:13 min) matches compared to U17 (36:31 ± 2:30 min, ES = 2.59: very large) and U21 (36:48 ± 2:53 min, ES = 2.40: very large). Senior matches had a longer BOP duration and greater number of BOP cycles than U17 (ES = 0.17: trivial, ES = 2.20: very large, respectively) and U21 (ES = 0.17: trivial, ES = 0.99: moderate, respectively). U17 matches had a lower frequency of BOP cycles > 60 s (ES = − 1.33: large) compared to senior.

Conclusion Although there was a difference in the total match duration, U17 and U21 matches have similar BIP time as seniors, suggesting that U17 and U21 players should be conditioned to withstand the elite senior BIP duration. In training practice, high-intensity short-duration games are suggested for repeating the duration demands of competition.

Keywords Physical demands · Time–motion analysis · Team sport · Worst case scenario · Ball-in-play–ball-out-of-play ratio

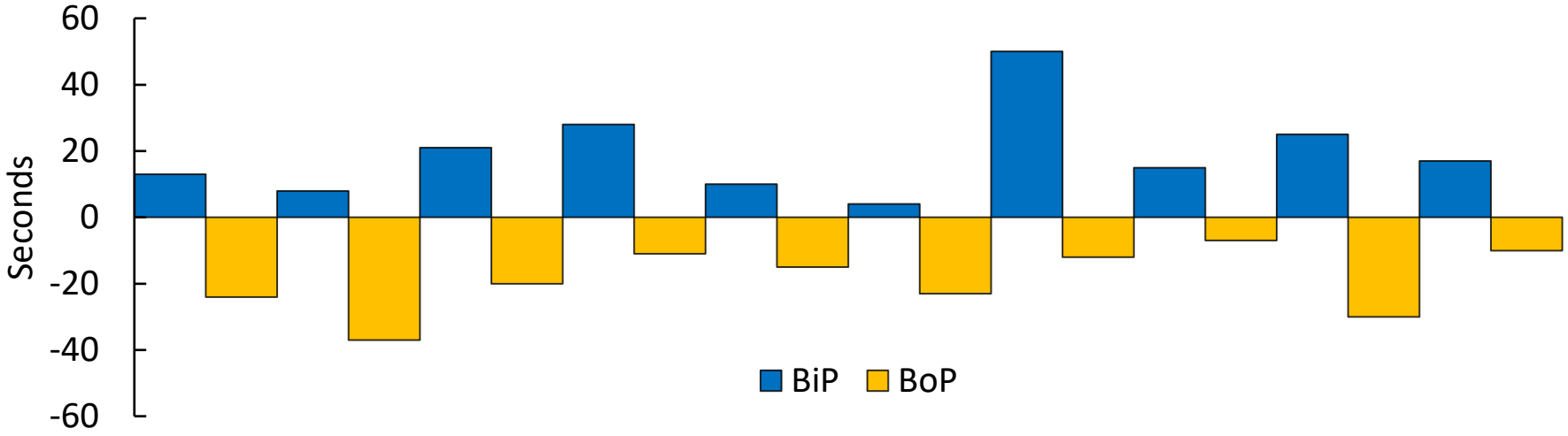
Overall game duration

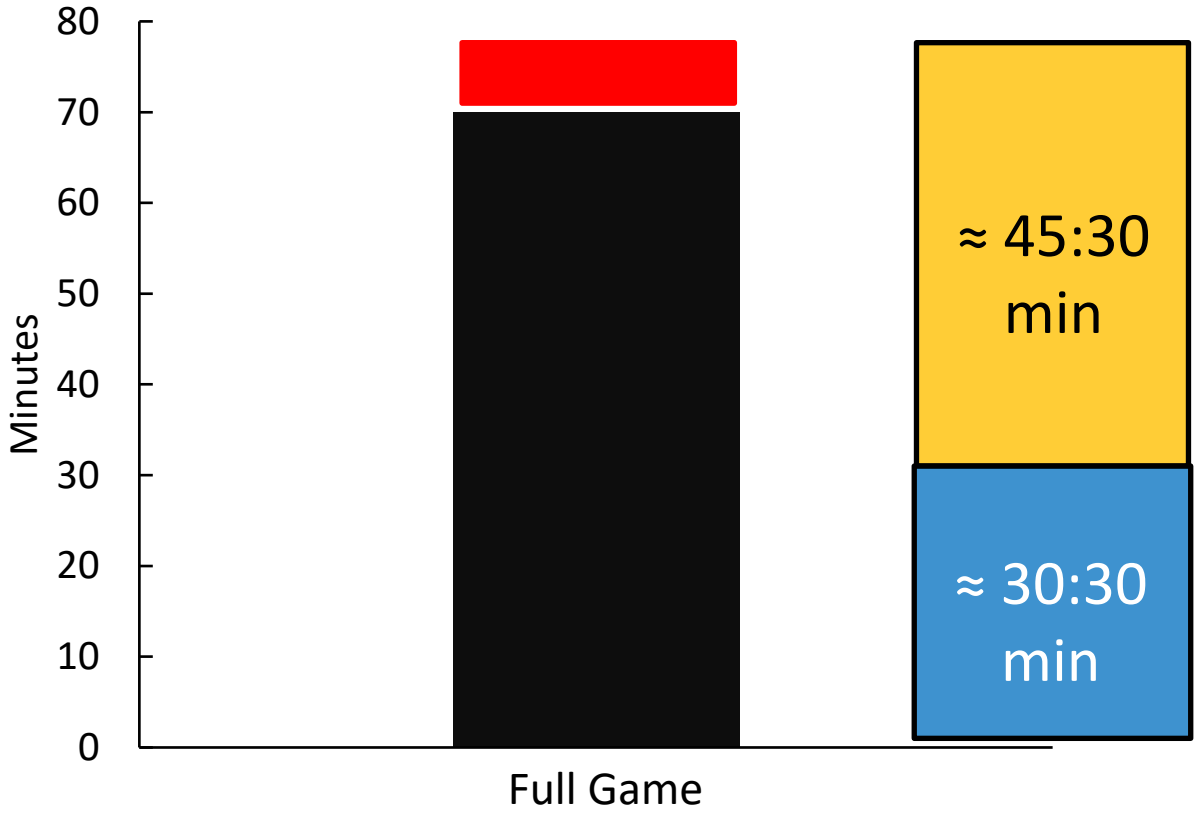
Duration and number of BiP & BoP cycles

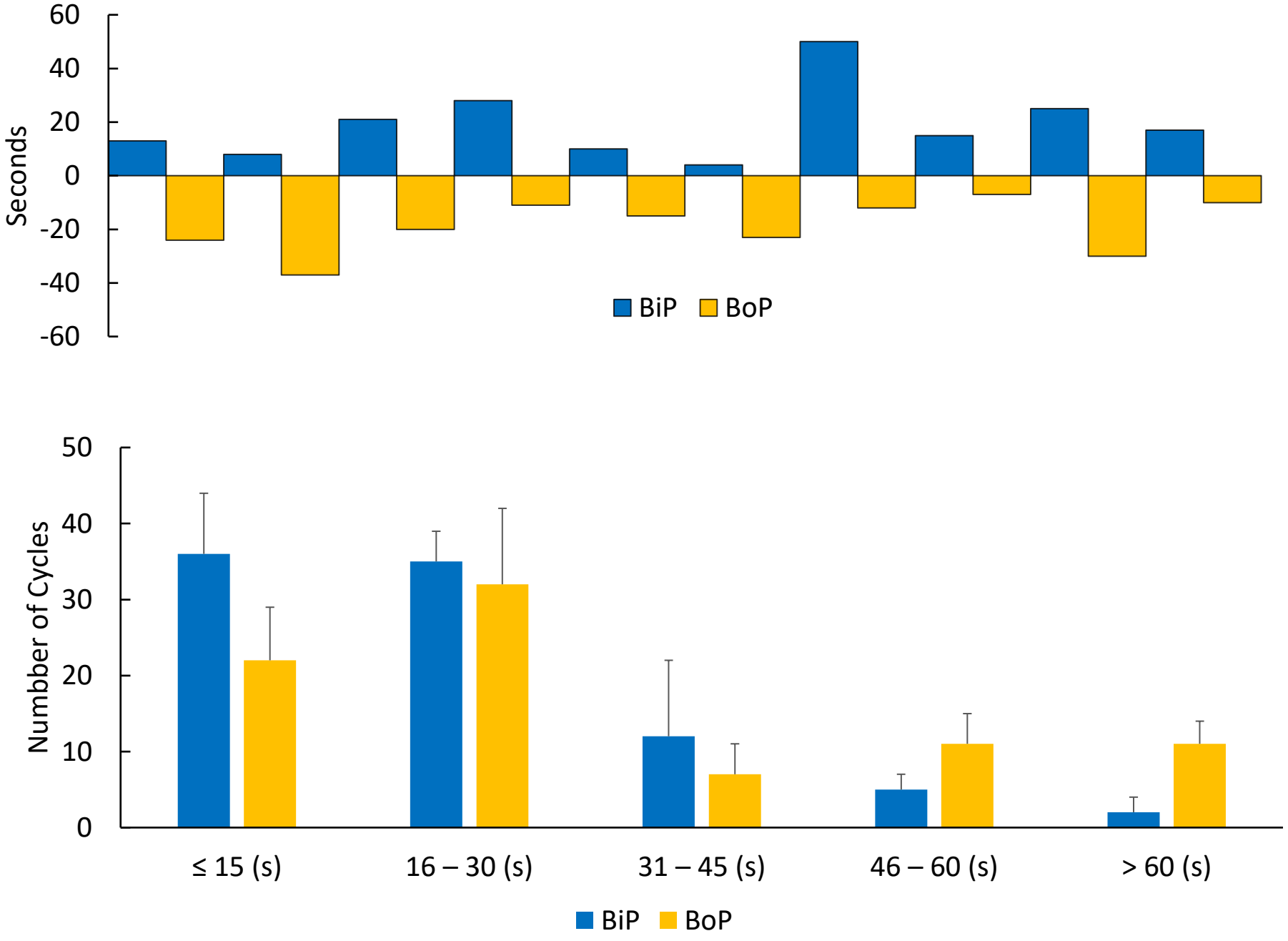
Individual duration and number of BiP & BoP cycles

Frequency of BiP/BoP

Number & duration of stoppages

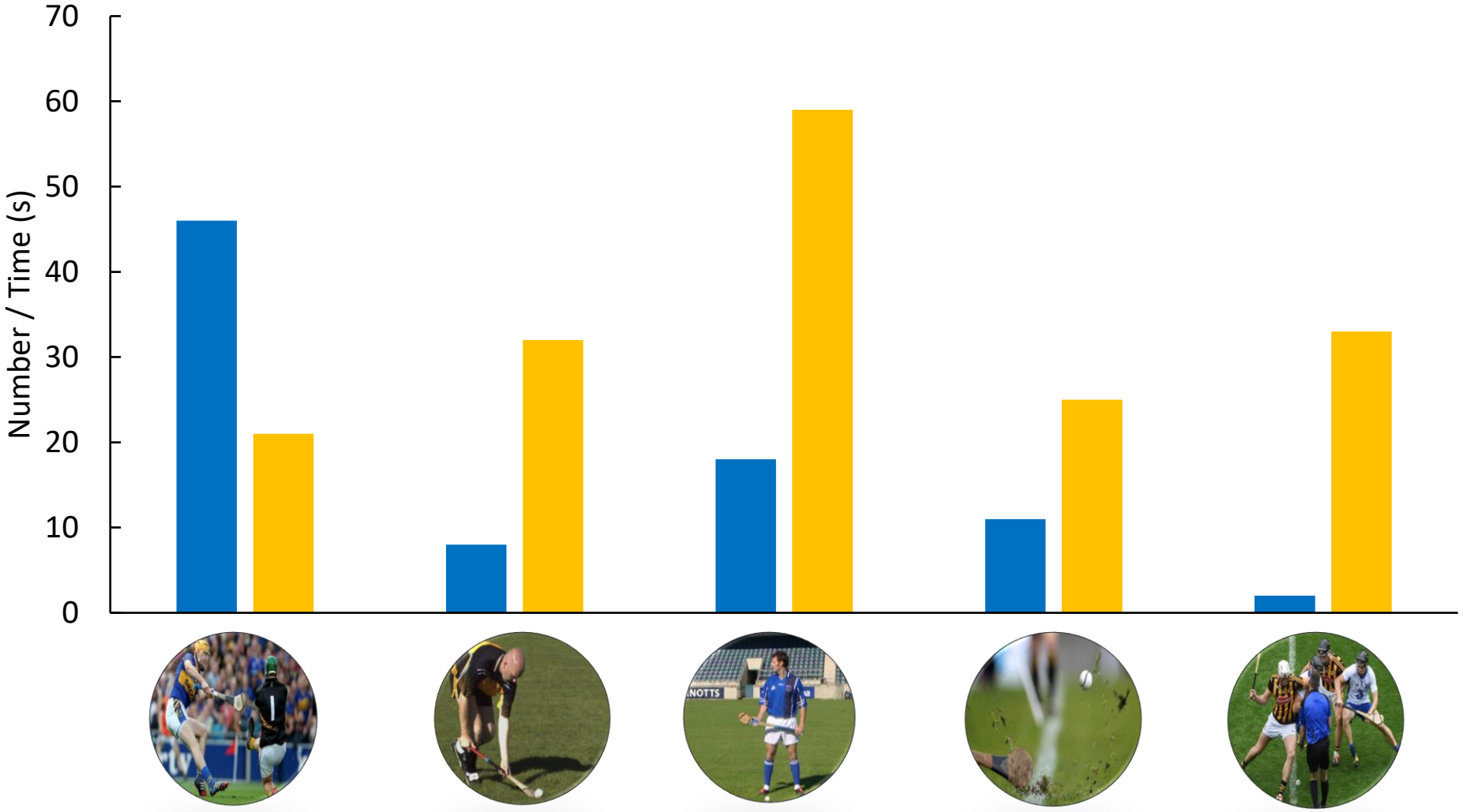

60
40
20
0
-20
-40
-60
Seconds
BiP
BoP


80
70
60
50
40
30
20
10
0
Minutes
≈ 45:30 min
≈ 30:30 min
Full Game


60
40
20
0
-20
-40
-60
Seconds
BiP
BoP
50
40
30
20
10
0
Numbber of Cycles
≤ 15 (s)
16 – 30 (s)
31 – 45 (s)
46 – 60 (s)
> 60 (s)
BiP
BoP

GAME STOPPAGES

GAME STOPPAGES



Notes

Duration Demands

- *Hurling is a stop-start game*
- *80% BiP/BoP < 30 s*

Stoppages

- *Shots at Goal - Puckouts*
- *≈ 20 s restarts*

Physical Demands

Position

Between Half

Random chaotic invasion-type game

Skills of the game require high levels of coordination

Ball can travel large distances

Full Game – Positions – Temporal Decrement

Match-Play Temporal and Position-Specific Physical and Physiological Demands of Senior Hurlers

Damien Young,[1] Marco Beato,[2] Laurent Mourot,[1,3,4] and Giuseppe Coratella[5]

[1]Research Unit EA3920 Prognostic Markers and Regulatory Factors of Cardiovascular Diseases and Exercise Performance, Exercise Performance Health, Innovation Platform, University Bourgogne Franche-Comté, Besançon, France; [2]Department of Science and Technology, Faculty of Health and Science, University of Suffolk, Ipswich, United Kingdom; [3]EA3920 Prognostic Factors and Regulatory Factors of Cardiac and Vascular Pathologies, Exercise Performance Health Innovation–EPHI, University Bourgogne Franche-Comté, Besançon, France; [4]Tomsk Polytechnic University, Tomsk, Russia; and [5]Department of Biomedical Sciences for Health, University of Milan, Milan, Italy

Abstract

Young, D, Beato, M, Mourot, L, and Coratella, G. Match-play temporal and position-specific physical and physiological demands of senior hurlers. *J Strength Cond Res* XX(X): 000–000, 2019–The aims of the current study were to examine the temporal differences in match-running performances and heart rate (HR) in elite senior hurling players between halves of play and field positions. Global positioning systems (10 Hz) and HR monitors were used to collect data from 48 players over 18 games. Running performances (total distance [TD], relative distance, high-speed running [HSR], sprint efforts [SE], mean length of sprints, and sprint distance [SD]) and HR values (HRmean and HRpeak) were assessed. Decrements in TD ($p = 0.009$, effect size [ES] = −0.15), relative distance ($p = 0.009$, ES = −0.18), HSR ($p = 0.001$, ES = −0.28), SE ($p = 0.001$, ES = −0.23), SD ($p = 0.001$, ES = −0.24), HRmean ($p < 0.001$, ES = −0.38), and HRpeak ($p < 0.001$, ES = −0.21) were found between halves. Half backs showed between-half

Key Words team sport, performance, match-play demands, high-speed running, sprint distance, heart rate

Introduction

Hurling is one of the national sports played in Ireland. All players represent their subelite (club) team where the best players are selected to represent their elite (intercounty) team (42). Elite-level games attract large attendances of over 80,000 people at the finals in Croke Park with several million people watching on television around the world (34). Counties compete for a Provincial and All-Ireland elite Championship during the playing season of February to September (34). The game is played on a pitch (140 × 90 m) that is 40% larger compared with a soccer pitch (110 × 70 m) and contested by 2 teams of 15 players (1 goalkeeper and 14 outfield players) over a duration of 70 minutes (35 minutes per half).

Total distance

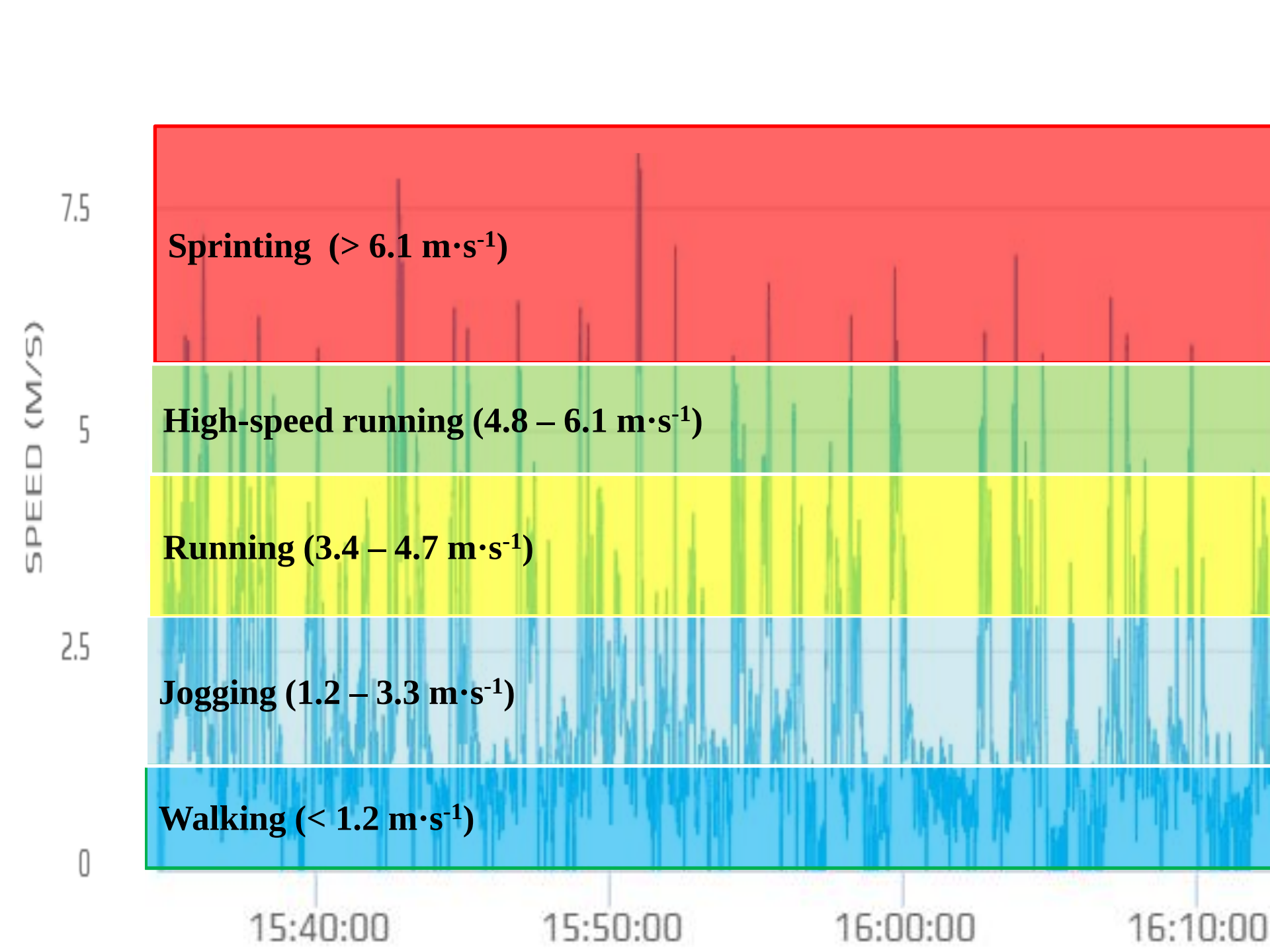
Relative distance

Distance at each speed

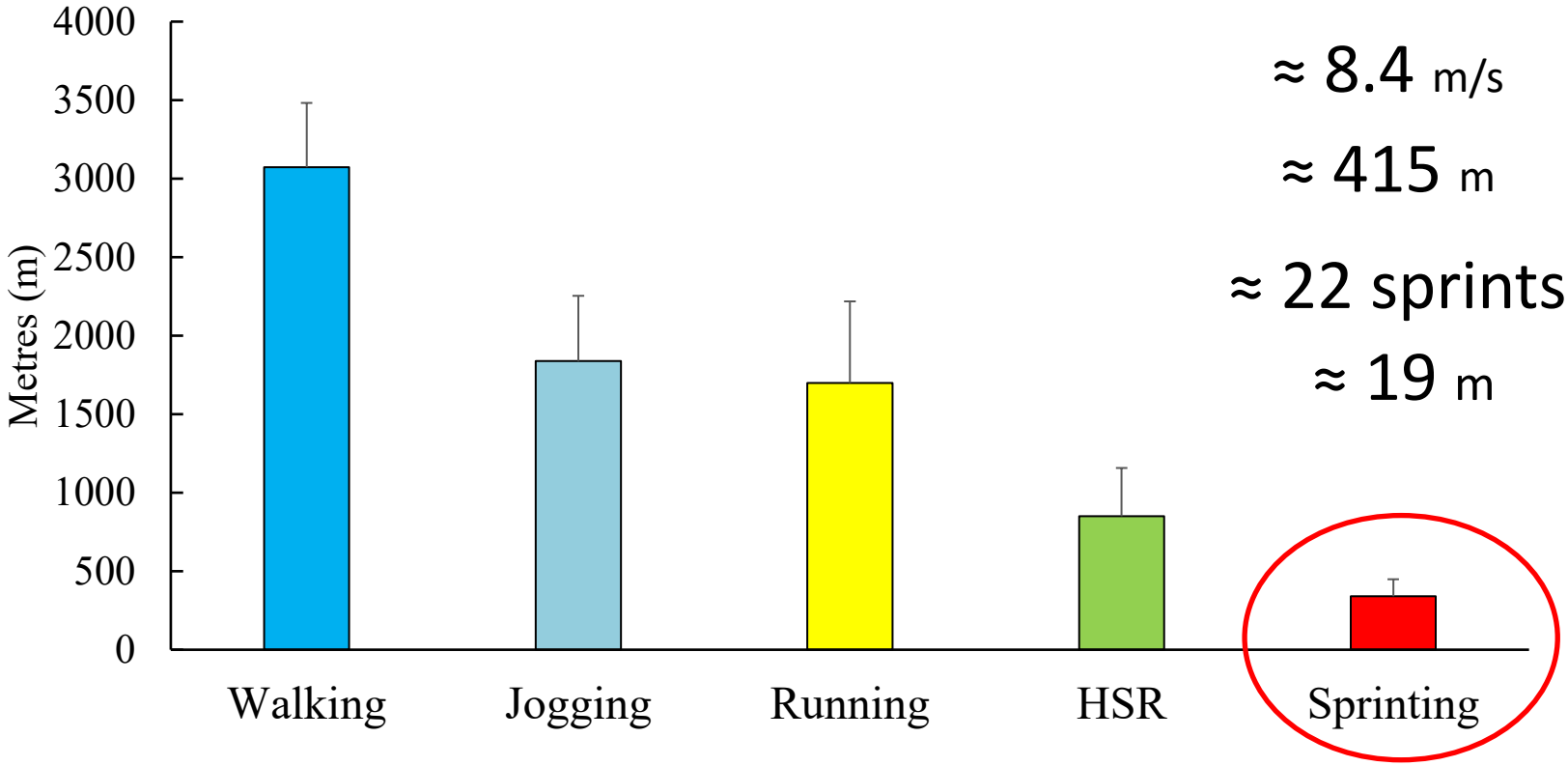
Peak speed

Number of sprints

Length of sprint


Sprinting (> 6.1 m·s-1)
High-speed running (4.8 – 6.1 m·s-1)
Running (3.4 – 4.7 m·s-1)
Jogging (1.2 – 3.3 m·s-1)
Walking (< 1.2 m·s-1)
SPEED (M/S)
7.5
5
2.5
0
15:40:00
15:50:00
16:00:00
16:10:00

Results

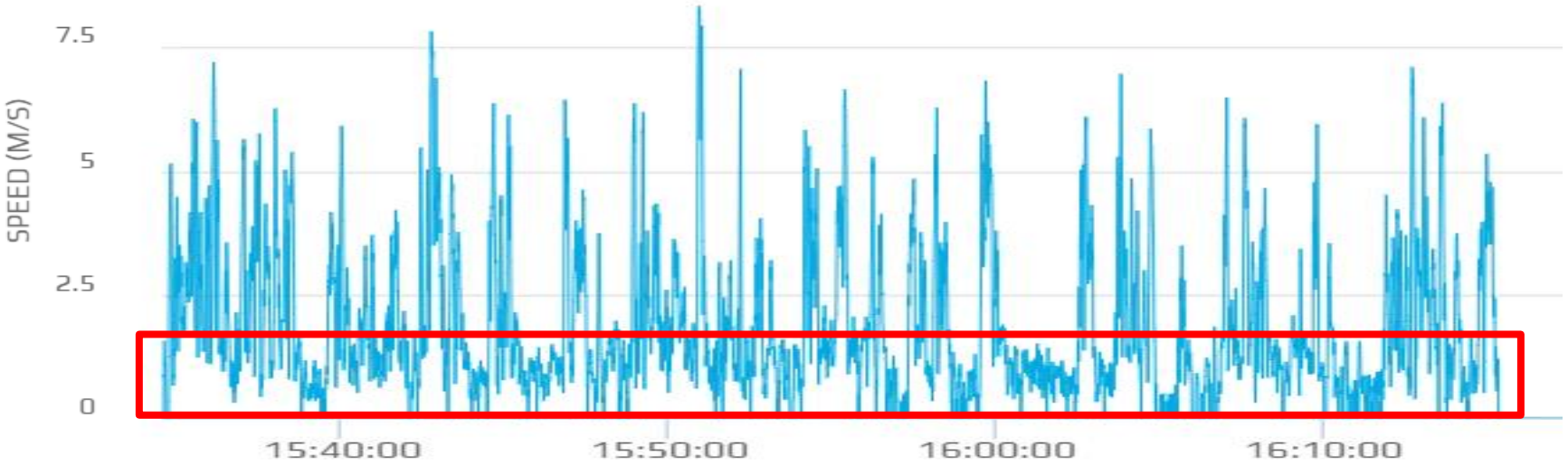


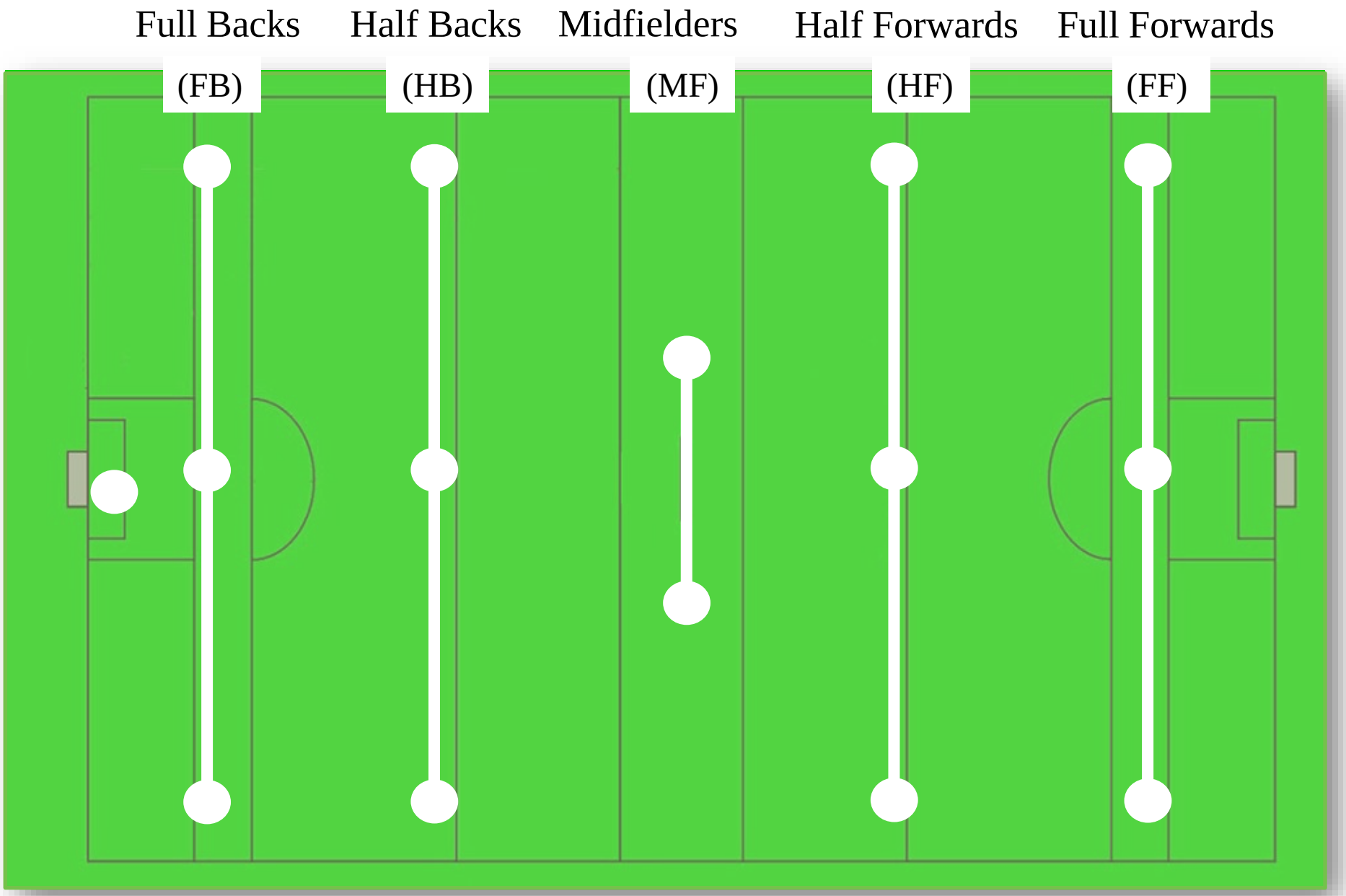
≈ 8.4 m/s

≈ 415 m

≈ 22 sprints

≈ 19 m



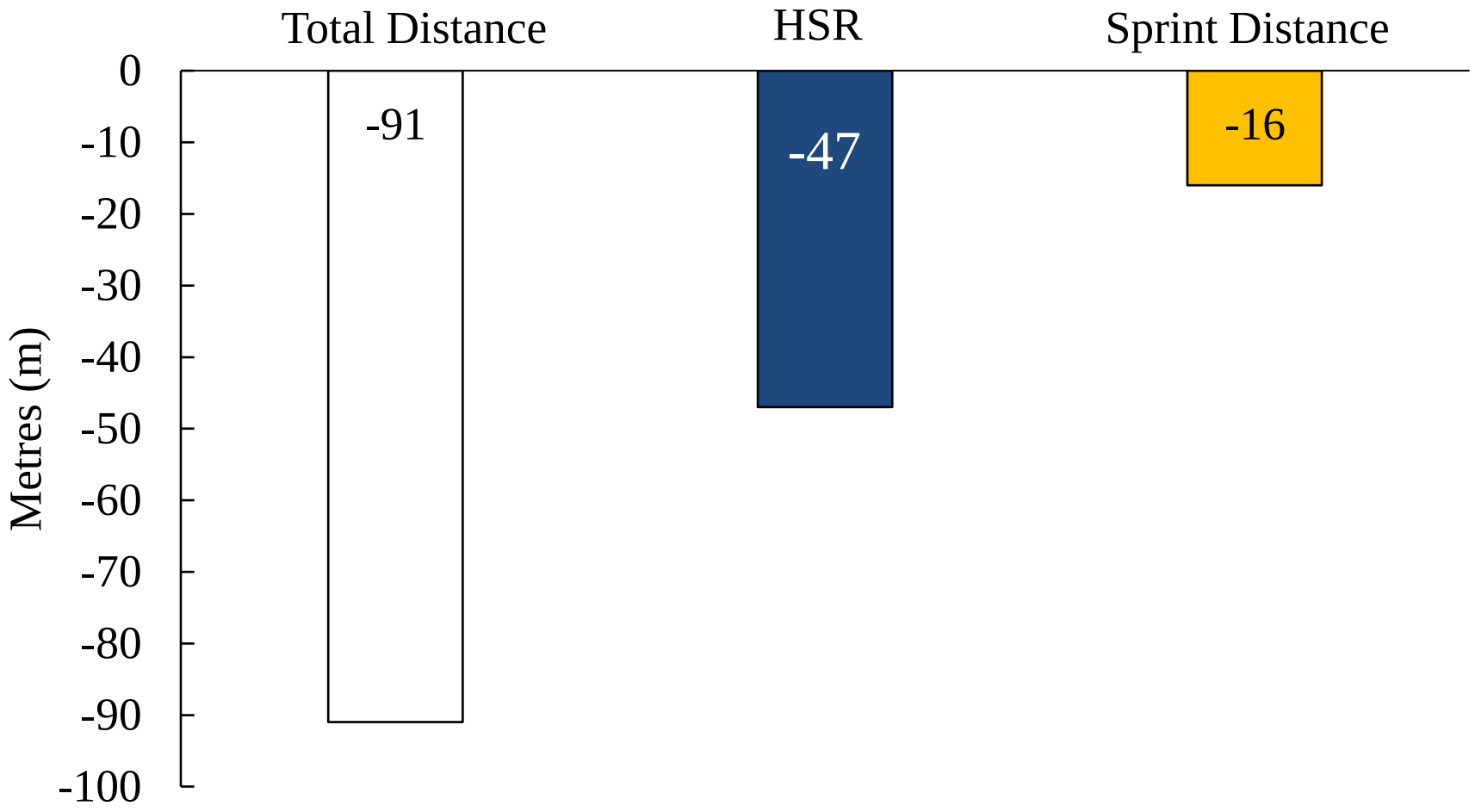


(Gaelic Athletic Association, 2019)

	TD (m)	HSR (m)	SD (m)
FULL BACK	7235	671	318
HALF BACK	8516[a]	1086[a]	313
MID-FIELD	8679[a]	954[a]	330
HALF FORWARD	8217[a]	954[a]	374
FULL FORWARD	6770[bcd]	657[bcd]	353

a = diff from FB, b = diff from HB, c = diff from MF, d = diff from HF

Between Halves



Notes

Duration Demands

- *Hurling is a stop-start game*
- *80% BiP/BoP < 30 s*

Stoppages

- *Shots at Goal*
- *≈ 20 s restarts*

Physical Demands

- *Perform at least 22 sprints*
- *Reach peak speeds of 8.4 m/s*

Position

- *Extra TD, HSR for middle 3*
- *Everyone can perform sprint training together*

Between Half

- *Minimal drop-off in TD, HSR, sprint distance*

PLOS ONE

RESEARCH ARTICLE

The match-play sprint performance of elite senior hurlers during competitive games

Damien Young[1☯*], **Giuseppe Coratella**[2☯], **Shane Malone**[3,4], **Kieran Collins**[3,4], **Laurent Mourot**[1,5], **Marco Beato**[6]

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Abstract

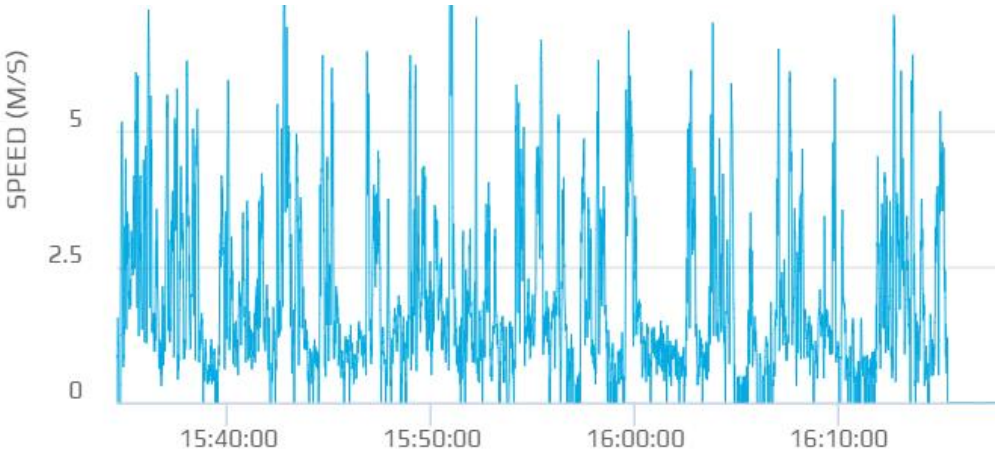
The typical sprint profile in elite hurling has yet to be established. The purpose of this study was to investigate the sprinting demands of elite hurling competition and characterize the sprinting patterns of different playing positions. GPS (10-Hz, STATSports Viper) were used to collect data from 51 hurlers during 18 games. The total sprint ($\geq$22 km·h^{-1}) distance (TSD), the number of sprints (NOS) classified as length (<20 m, $\geq$20 m) and relative speed thresholds (<80%, 80–90%, >90%), the between-sprint duration and the number of repeated-sprint bouts ($\geq$2 sprints in $\leq$60 s) were analyzed. The NOS was 22.2 ± 6.8 accumulating 415 ± 140 m TSD. The NOS <20 m, $\geq$20 m was 14.0 ± 4.7 and 8.1 ± 3.6 respectively. The NOS <80%, 80–90% and >90% was 10.6 ± 4.3, 8.2 ± 3.6, 3.4 ± 2.4 respectively. The between-sprint duration and the repeated-sprint bouts were 208 ± 86 s and 4.5 ± 2.6 respectively. TSD (ES = -0.20), NOS (ES = -0.34), NOS <20 m (ES = -0.33), $\geq$20 m (ES = -0.24), 80–90% (ES = -0.35) >90% (ES = -0.13) and repeated-sprint bouts (ES = -0.28) decreased between-halves. Full-backs performed a lower NOS <80% than half-backs (ES = -0.66) and a shorter mean duration of sprints than half-backs (ES = -0.75), midfielders (ES = -1.00) and full-forwards (ES = -0.59). These findings provide a sprint profile of elite hurling match-play that coaches should consider to replicate the sprint demands of competition in

NOS < 20 m, > 20 m

NOS < 80%, 80-90%, > 90%

Duration between sprints

Repeated-sprint bouts

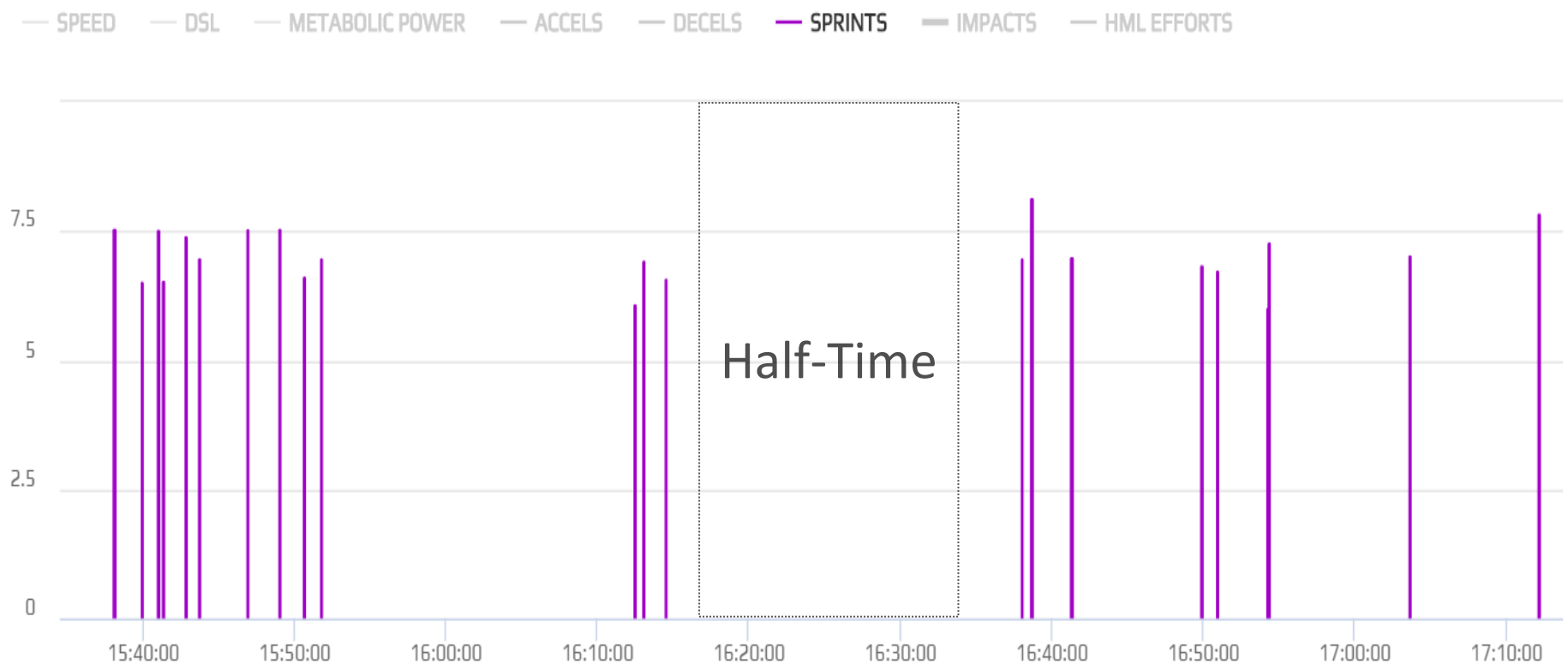



SPEED
DSL
METABOLIC POWER
ACCELS
DECELS
SPRINTS
IMPACTS
HML EFFORTS
> 6.1 m·s-1
SPEED (M/S)
7.5
5
2.5
0
15:40:00
15:50:00
16:00:00
16:10:00
16:20:00
16:30:00
16:40:00
16:50:00
17:00:00
17:10:00

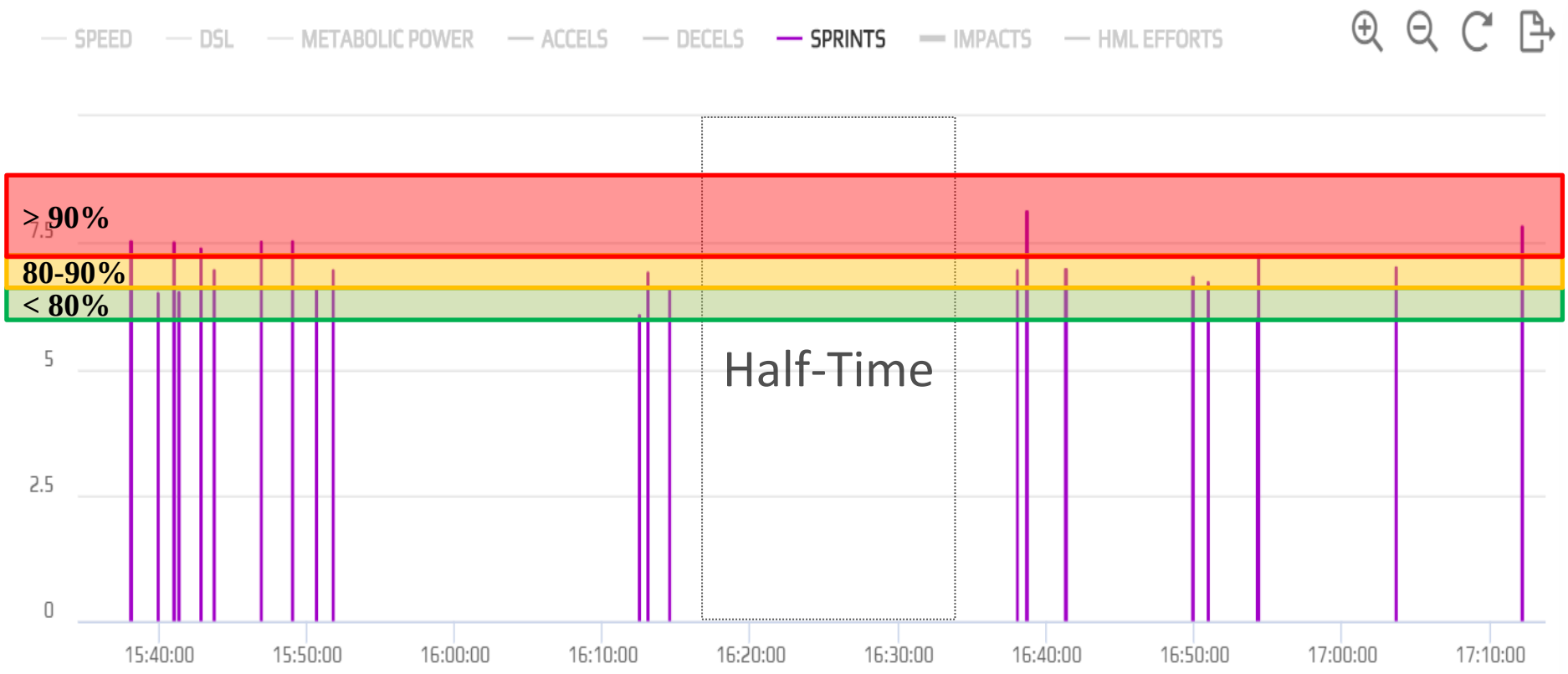
Number
≈ 14, ≈ 8

Duration
≈ 208 s

Repeated-sprint bouts
≈ 5



< 80%	80 - 90%	> 90%
≈ 11	≈ 8	≈ 3



Number of Sprints

< 20 m, > 20 m

Peak Speed

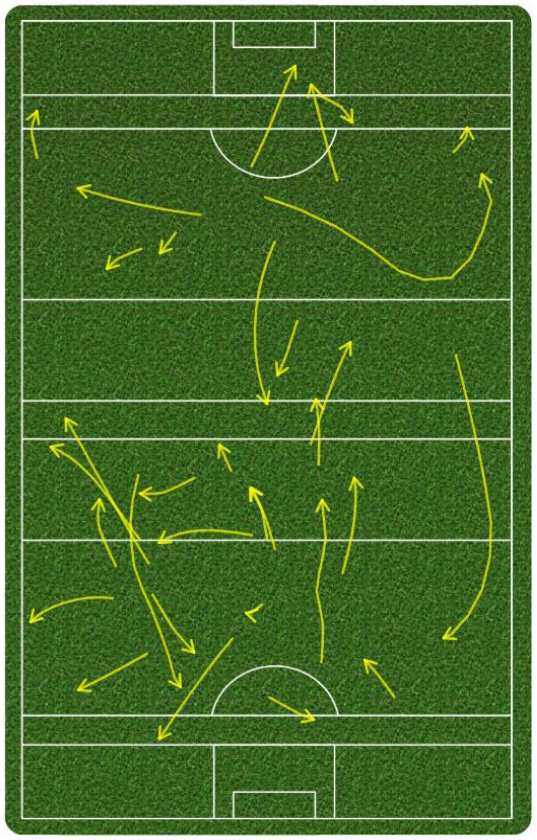
POSITIONS

< 80%, 80-90%, > 90%

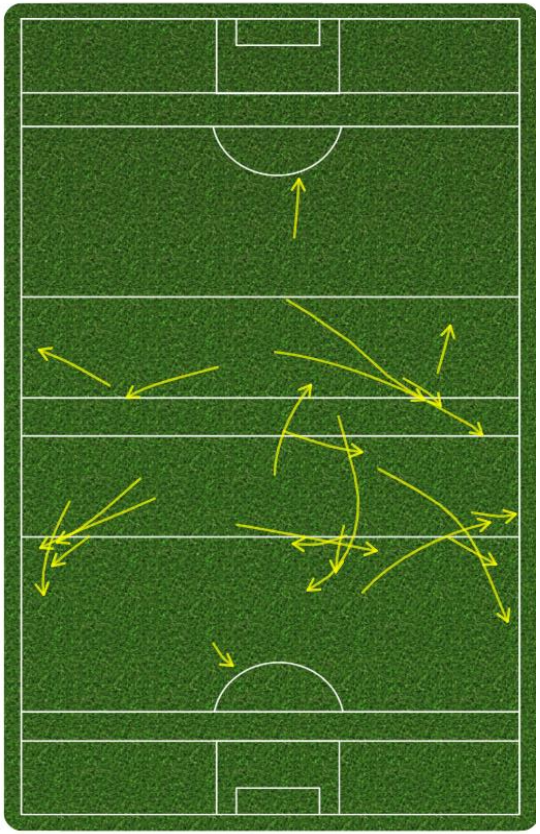
Duration Between Sprints

Repeated-Sprint Bouts

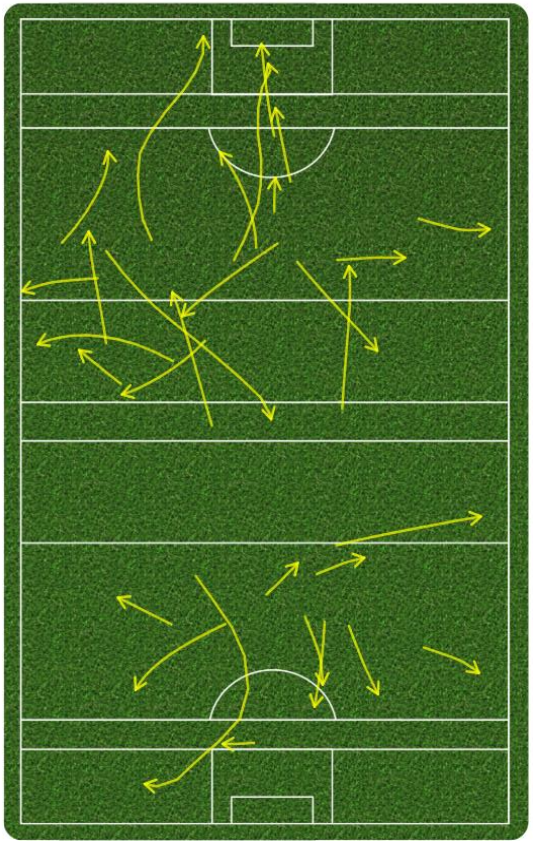
Half Back Line



Midfield



Half Forward Line



Number of Sprints
≈ -2

< 20 m ≈ -1

> 20 m ≈ -1

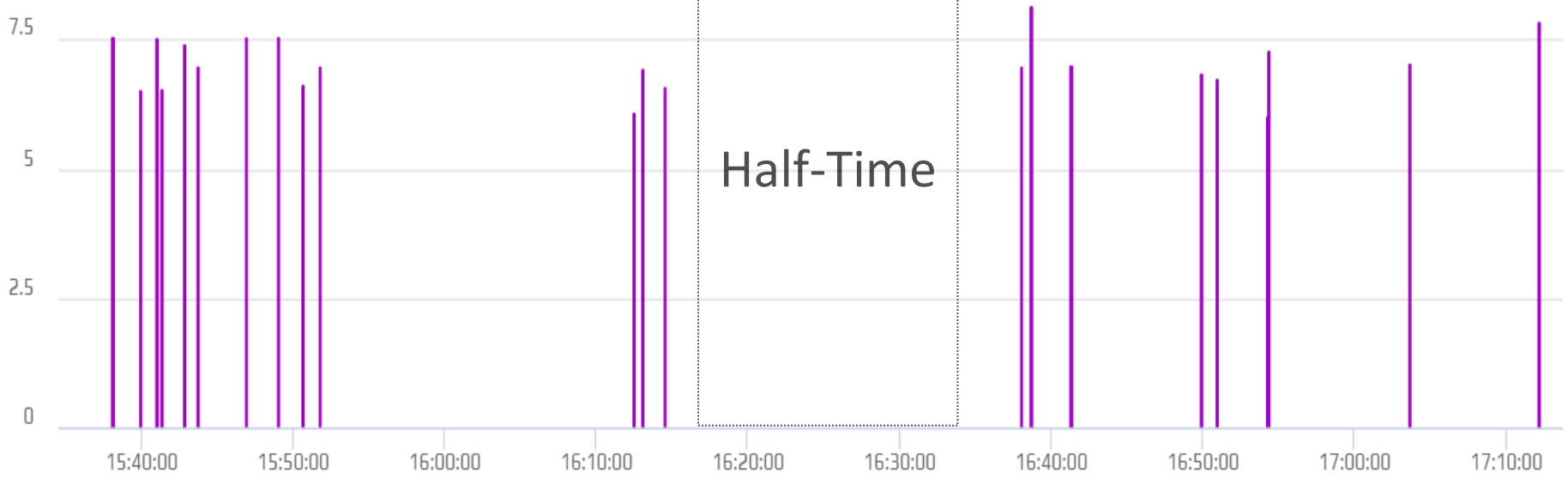
< 80% ≈ -1
80-90% ≈ -1
90% ≈ 0

BETWEEN HALVES

Peak Speed
≈ -0.05 m/s

Duration Between Sprints
≈ 16 s

Repeated-Sprint Bouts
≈ -1



Notes

Duration Demands

- *Hurling is a stop-start game*
- *80% BiP/BoP < 30 s*

Stoppages

- *Shots at Goal*
- *≈ 20 s restarts*

Physical Demands

- *Perform at least 22 sprints*
- *Reach peak speeds of 8.4 m/s*
- *Vary the length of sprints*
- *Allow enough space to reach > 90% peak speeds*
- *Perform different intensities of sprints*

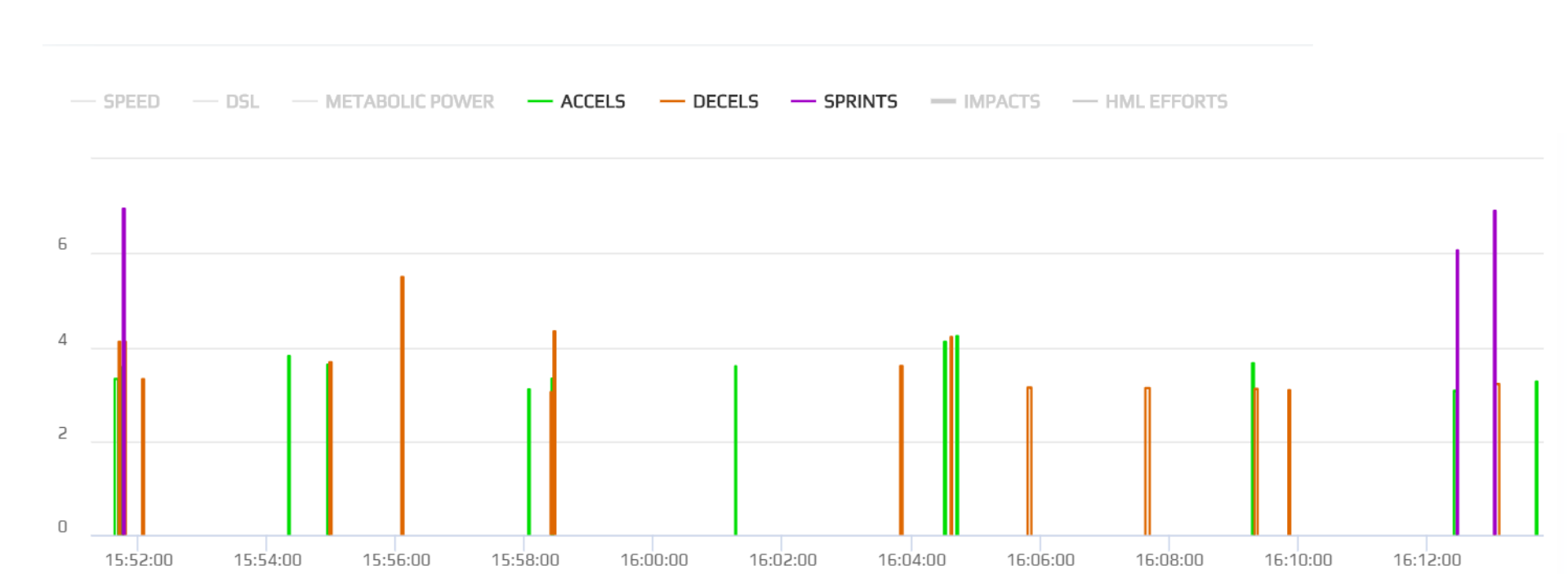
- *Vary the direction of sprints*
- *Repeated sprints are rare but do happen*

Position

- *Extra TD, HSR for middle 3*
- *Everyone can perform sprint training together*
- *Various directions of sprints*

Between Half

- *Minimal drop-off in TD, HSR, sprint distance*


SPEED
DSL
METABOLIC POWER
ACCELS
DECELS
SPRINTS
IMPACTS
HML EFFORTS
6
4
2
0
15:52:00
15:54:00
15:56:00
15:58:00
16:00:00
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16:04:00
16:06:00
16:08:00
16:10:00
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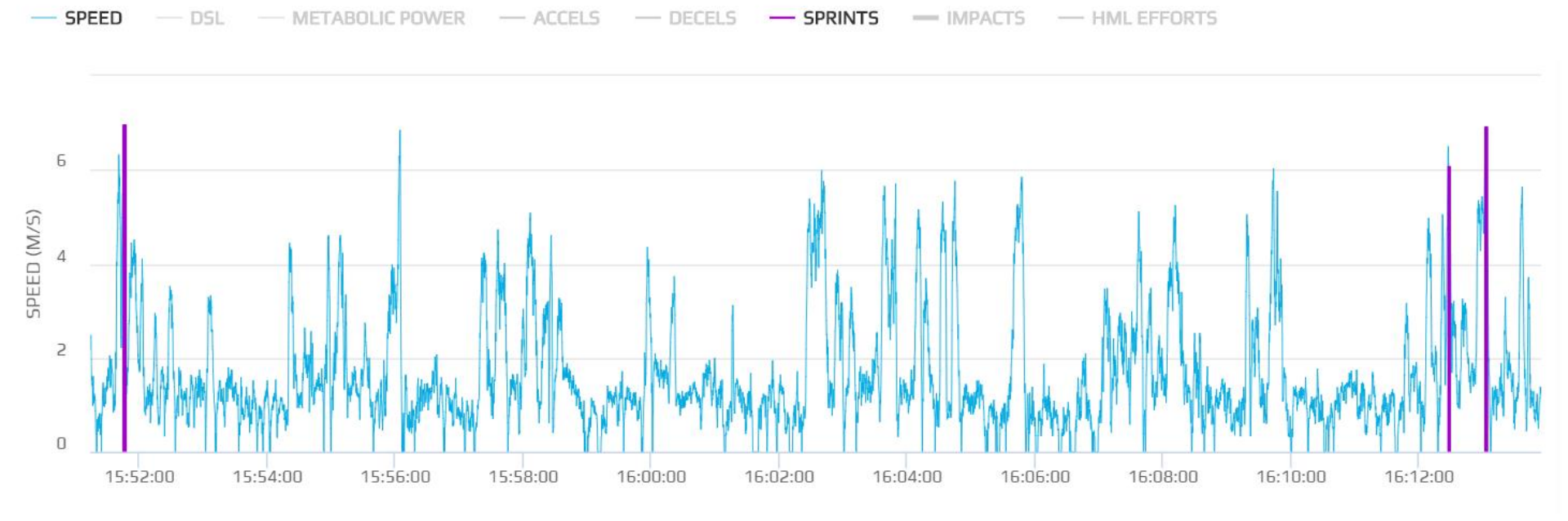
SPEED
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ACCELS
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SPRINTS
IMPACTS
HML EFFORTS
SPEED (M/S)
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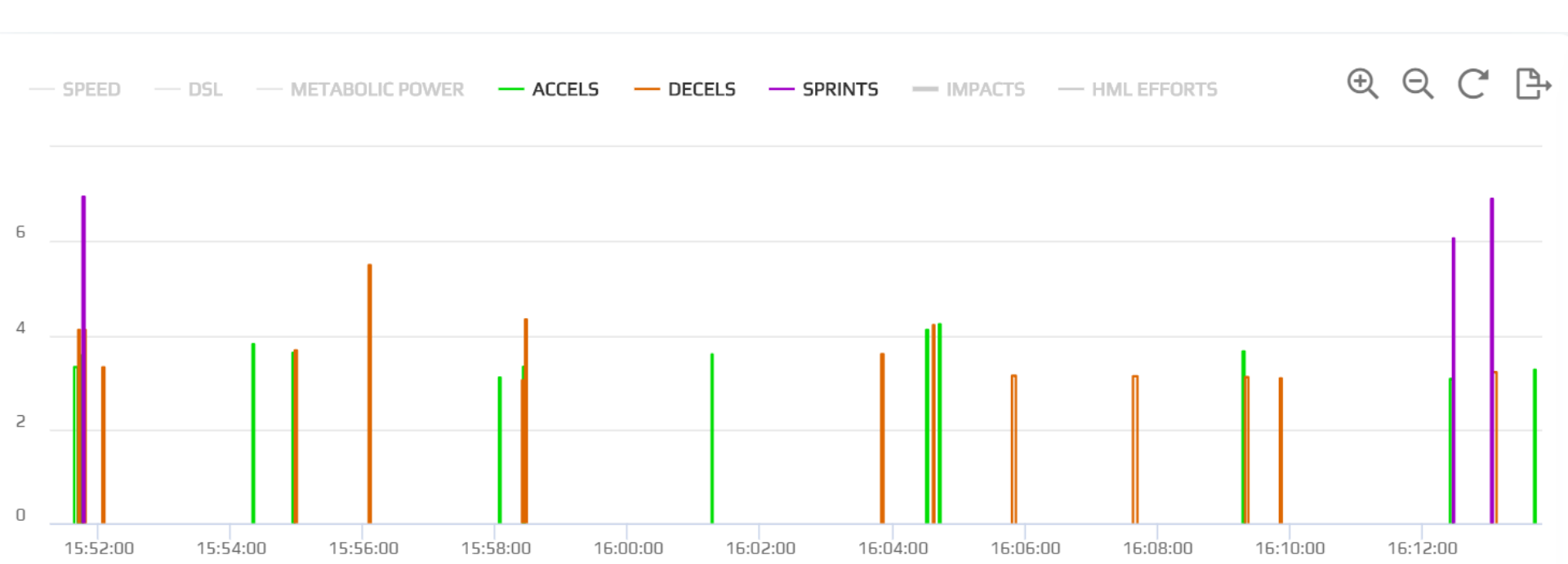
SPEED
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ACCELS
DECELS
SPRINTS
IMPACTS
HML EFFORTS
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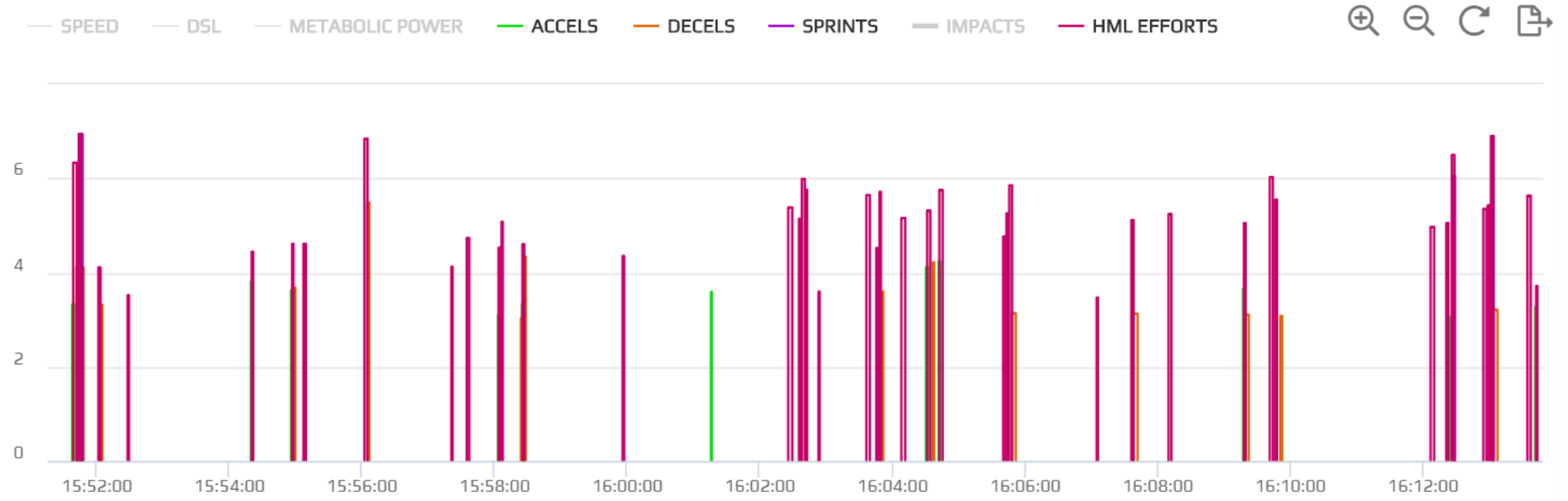
SPEED
DSL
METABOLIC POWER
ACCELS
DECELS
SPRINTS
IMPACTS
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16:06:00
16:08:00
16:10:00
16:12:00

Identification of Maximal Running Intensities During Elite Hurling Match-Play

Damien Young,[1] Shane Malone,[2,3] Marco Beato,[4] Laurent Mourot,[1,5,6] and Giuseppe Coratella[7]

[1]Research Unit EA3920 Prognostic Markers and Regulatory Factors of Cardiovascular Diseases and Exercise Performance, Exercise Performance Health, Innovation Platform, University of Bourgogne Franche-Comté, Besançon, France; [2]Gaelic Sports Research Center, Institute of Technology Tallaght, Dublin, Ireland; [3]The Tom Reilly Building, Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Liverpool, United Kingdom; [4]Faculty of Health and Science, Department of Science and Technology, University of Suffolk, Ipswich, United Kingdom; [5]EA3920 Prognostic Factors and Regulatory Factors of Cardiac and Vascular Pathologies, Exercise Performance Health Innovation (EPHI), University of Bourgogne Franche-Comté, Besançon, France; [6]Tomsk Polytechnic University, Tomsk, Russia; and [7]Department of Biomedical Sciences for Health, University of Milan, Italy

Abstract

Young, D, Malone, S, Beato, M, Mourot, L, and Coratella, G. Identification of maximal running intensities during elite hurling match-play. *J Strength Cond Res* XX(X): 000–000, 2018–The current study aimed to describe the duration-specific running intensities of elite hurling players during competition with respect to position using a rolling average method. Global positioning systems (10-Hz Viper; STATSport, Viper, Newry, Northern Ireland) were used to collect data from 36 elite hurling players across 2 seasons. Players were categorized according to playing positions (full-backs, half-backs, midfielders, half-forwards, and full-forwards). A total of 230 full match samples were obtained from 22 competitive games for analysis. The velocity-time curve was analyzed using a rolling average method, in which the maximum relative total distance (TD; $m \cdot min^{-1}$), high-speed running distance (HSR; $m \cdot min^{-1}$), and sprint distance (SD; $m \cdot min^{-1}$) intensities were calculated across 10 different rolling time durations (1–10 minutes) within each game. There were large to very large (effect sizes [ES] = 0.66–4.33) differences between 1 minute rolling averages and all other durations for TD, HSR, and SD. However, pairwise comparisons between 6 and 10 minutes for TD, HSR, and SD were smaller and more variable (ES = 0.07, trivial to ES = 0.85, moderate). Half-backs, midfielders, and half-forwards achieved a higher maximal relative TD and HSR in all duration-specific fields when compared with full-backs and full-forwards. No positional difference was observed in 1- and 2-minute durations for SD. Because the rolling average duration increased the maximum TD, HSR and SD running intensities decreased across all positions. These data provide knowledge of the peak running intensities of elite hurling competition and can be used to design training activities to sufficiently prepare players for these "worst-case scenarios."

Key Words GPS, rolling average, high-speed running, worse-case running, sprint distance

Introduction

Hurling is an intermittent stick and ball invasion team sport and one of the national sports of Ireland. It is a physically demanding and highly skillful game with periods of high-intensity efforts similar to other team sports (7,26,27). The game is 70 minutes (35 minutes per half) in duration and is played on a pitch 140 m long and 90 m wide. Two teams of 15 players (1 goalkeeper and 14 outfield players) contest for possession, and the aim is to outscore the opposing team by striking the ball through their goalpost, under or over the crossbar earning 3 points (goal) and 1 point, respectively (24). Players' physical, tactical, and technical roles differ between the 5 distinctive positions (full-backs, half-backs, midfielders, half-forwards, and full-forwards) (7,26,27). Ten elite teams each representing a county compete for Provincial and All-Ireland senior championship, which attract large attendances of over 80,000 spectators for the final (24).

Recently, there has been an increase in the utilization of

Maximum Intensity Periods

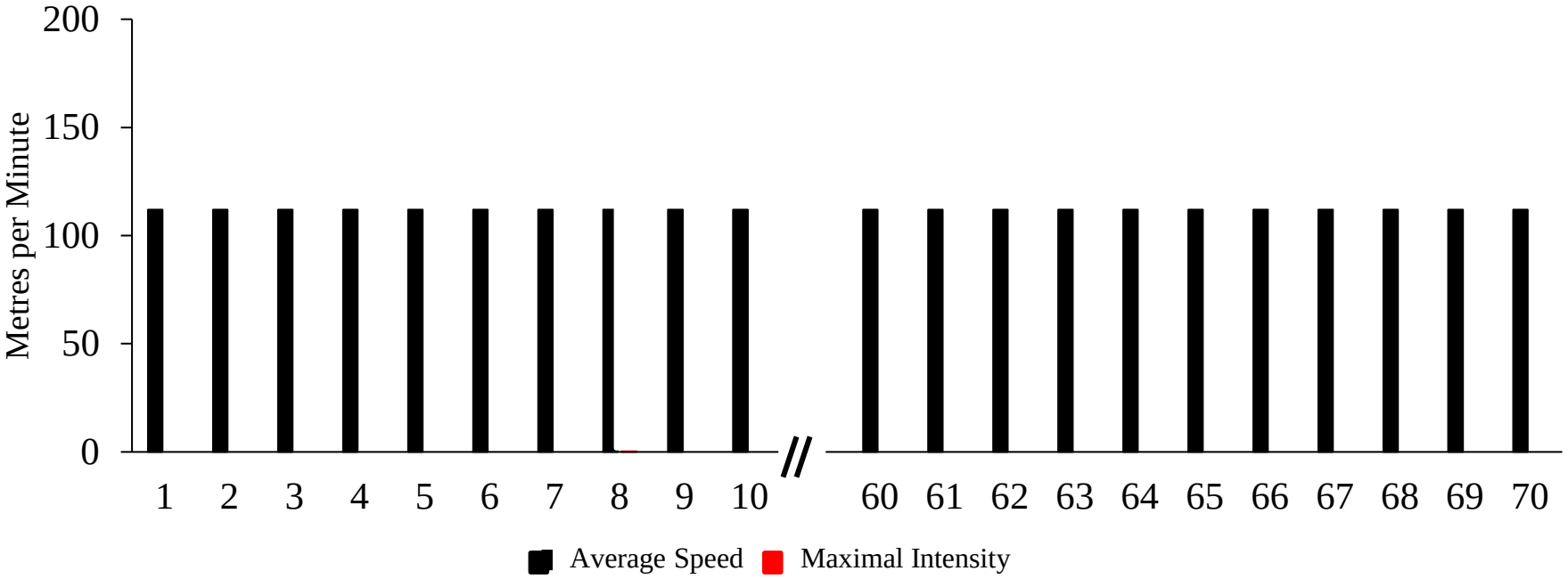
Total Distance

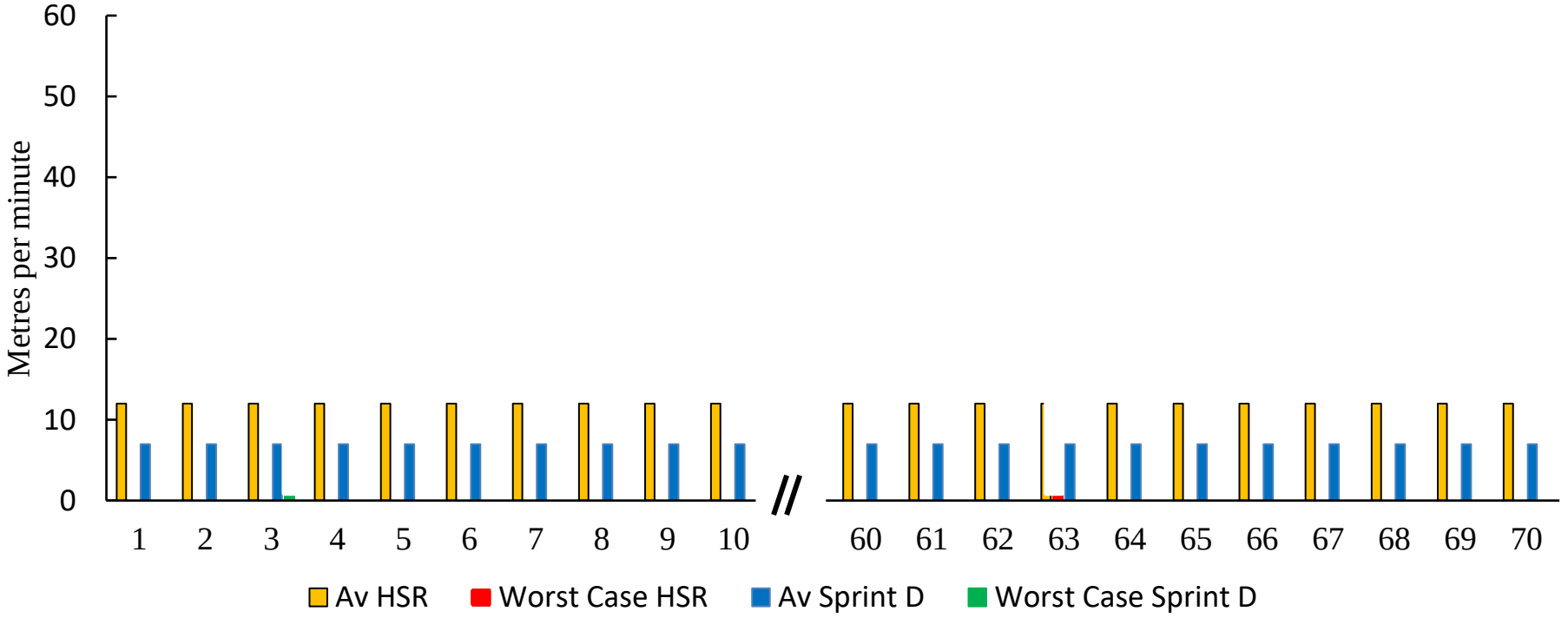
High-Speed Running

Sprint Distance

Full Game

Positions


200
150
100
50
0
Metres per Minute
1 2 3 4 5 6 7 8 9 10
60 61 62 63 64 65 66 67 68 69 70
Average Speed
Maximal Intensity


60
50
40
30
20
10
0
Metres per minute
1 2 3 4 5 6 7 8 9 10
60 61 62 63 64 65 66 67 68 69 70
Av HSR
Worst Case HSR
Av Sprint D
Worst Case Sprint D

Total Distance

HSR Distance

Full Back

Half Back
Midfield
Half Forward

Full Forward

POSITIONS

Sprint Distance

Full Back

Half Back

Midfield

Half Forward

Full Forward

4 – 5th min

MIP – TD: 178 m·min^{-1}, HSR: 40 m, SD: 40 m

Notes

Duration Demands

- *Hurling is a stop-start game*
- *80% BiP/BoP < 30 s*

Stoppages

- *Shots at Goal*
- *≈ 20 s restarts*

Physical Demands

- *Perform at least 22 sprints*
- *Reach peak speeds of 8.4 m/s*
- *Vary the length of sprints*
- *Allow enough space to reach > 90% peak speeds*
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Position

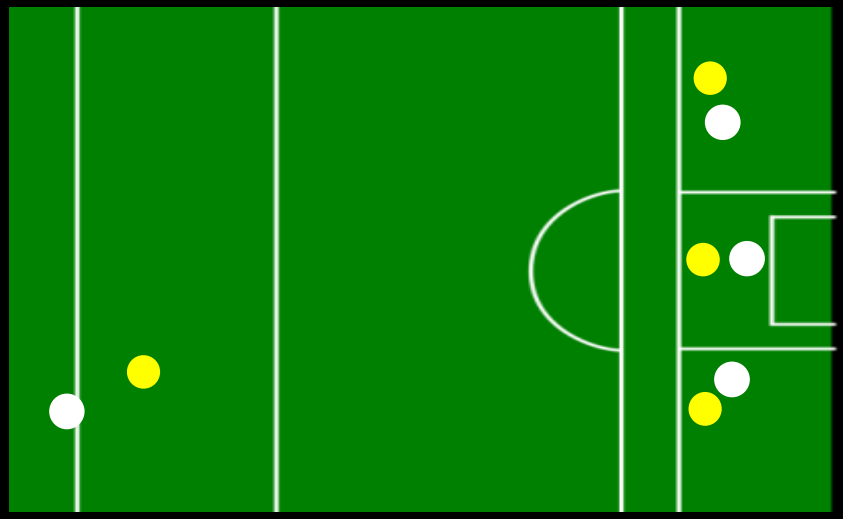
- *Extra TD, HSR for middle 3*
- *Everyone can perform sprint training together*
- *Various directions of sprints*
- *Similar MIP for SD*

Between Half

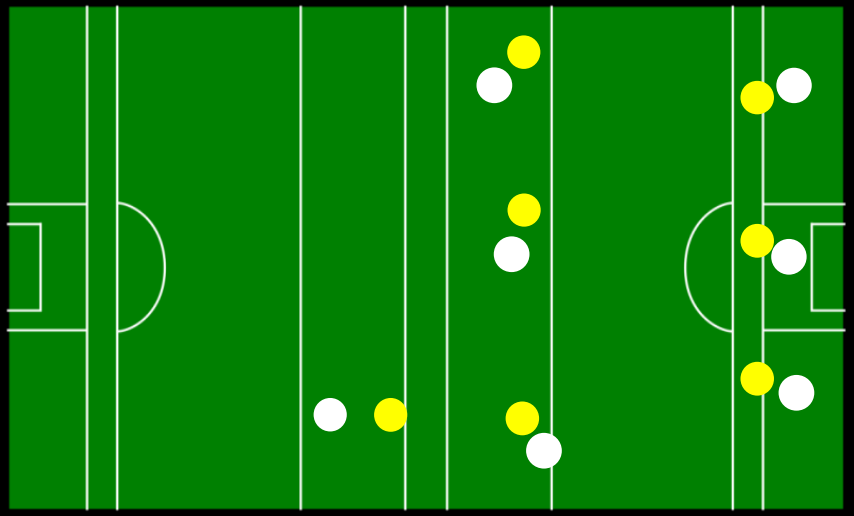
- *Minimal drop-off in TD, HSR, sprint distance*
- *Vary "MIP" over a session*

Practice Shots at Goal

A



C



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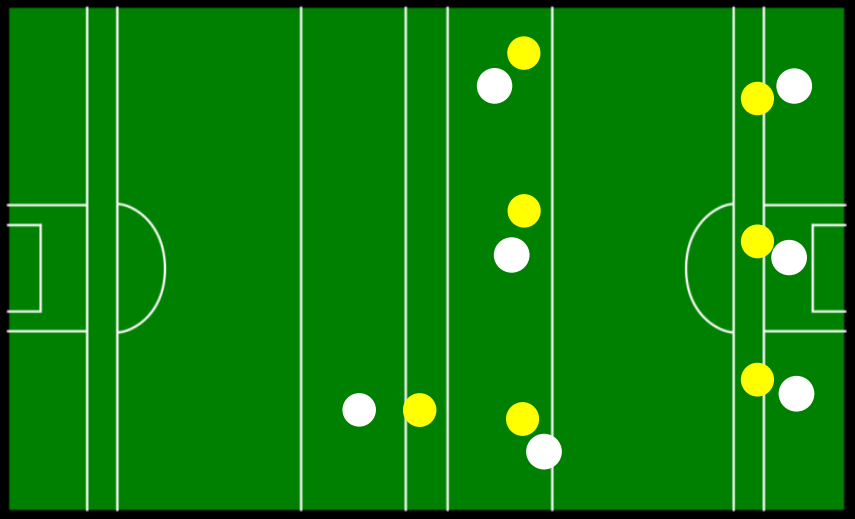
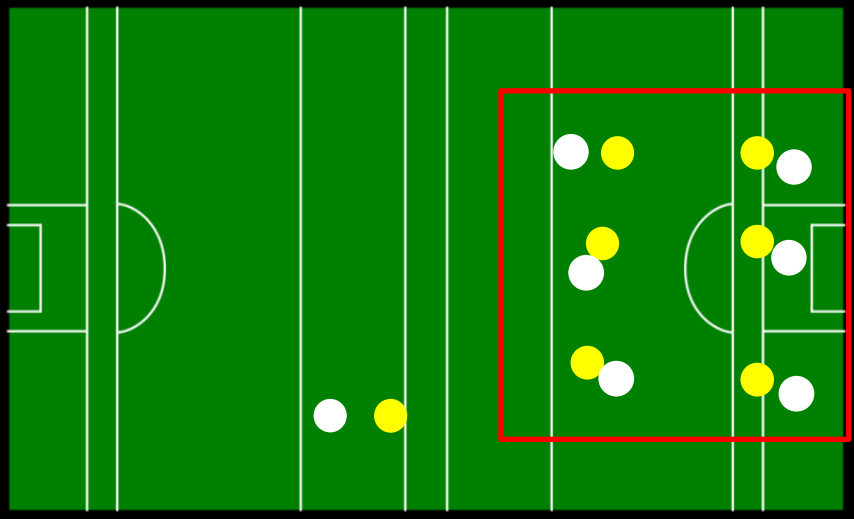
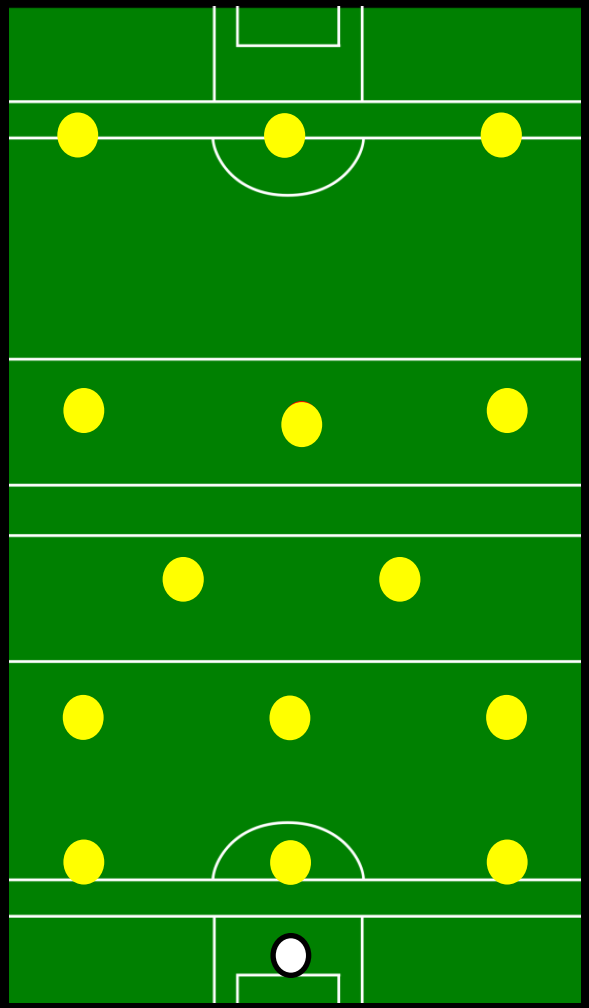
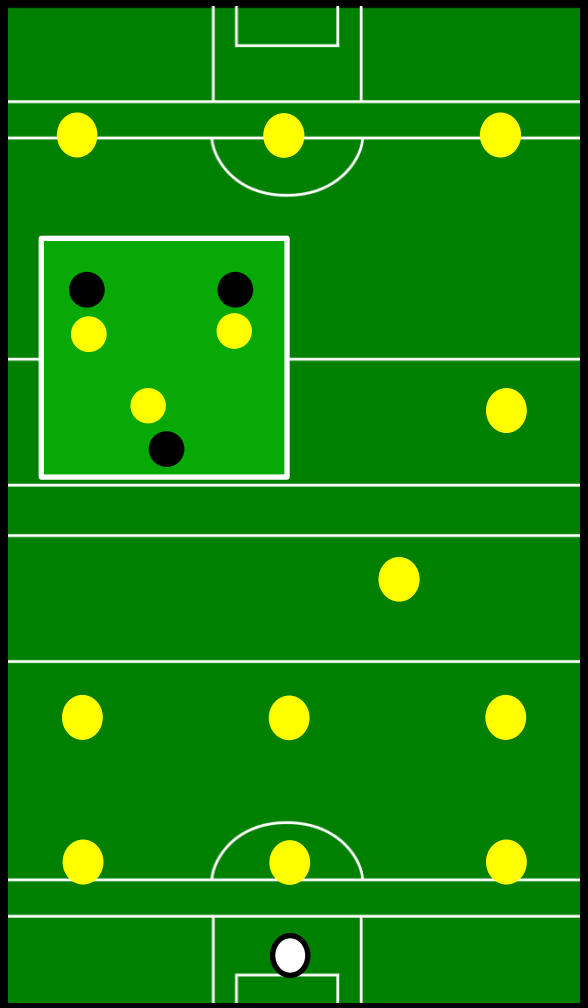


D



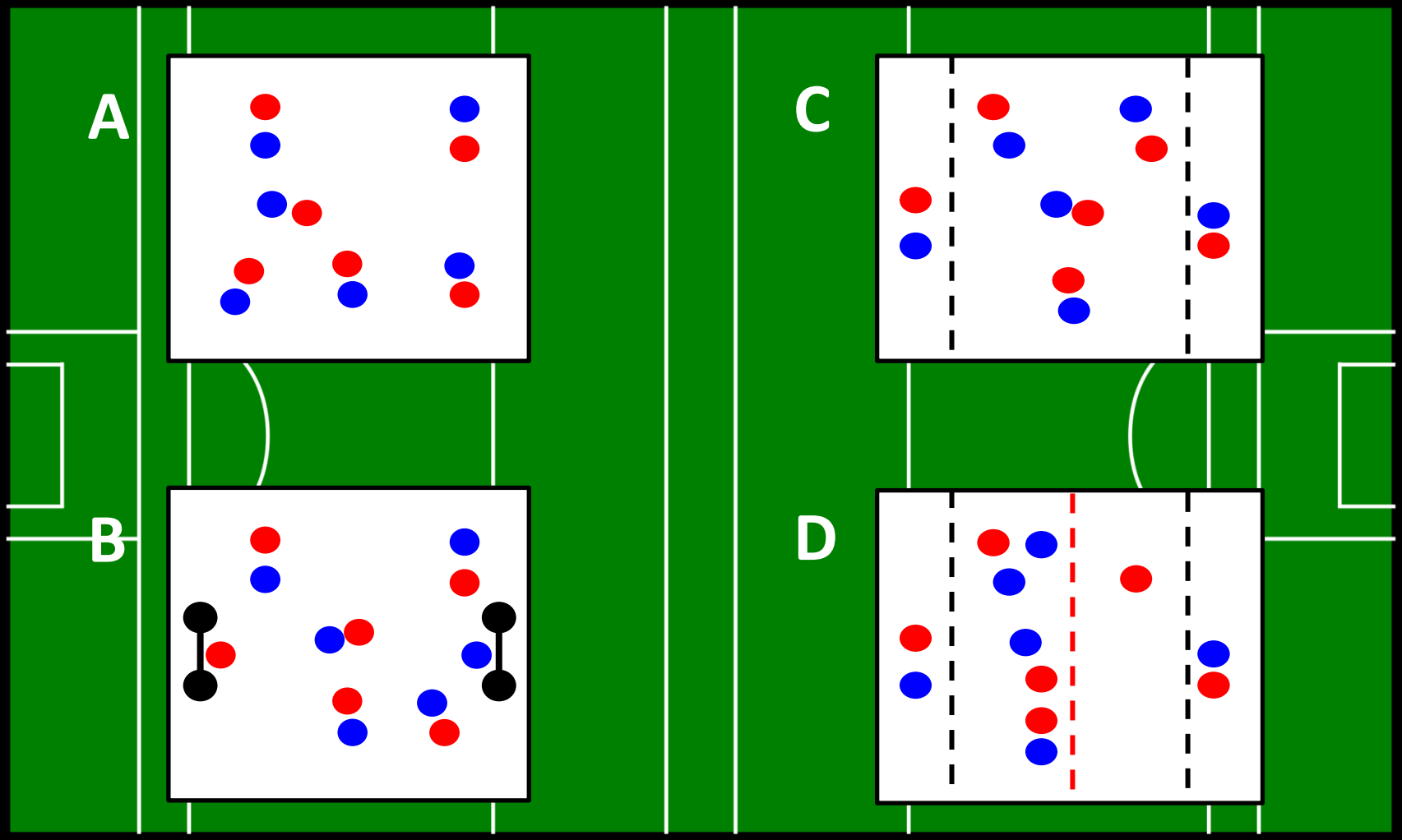
Practice Puck Outs



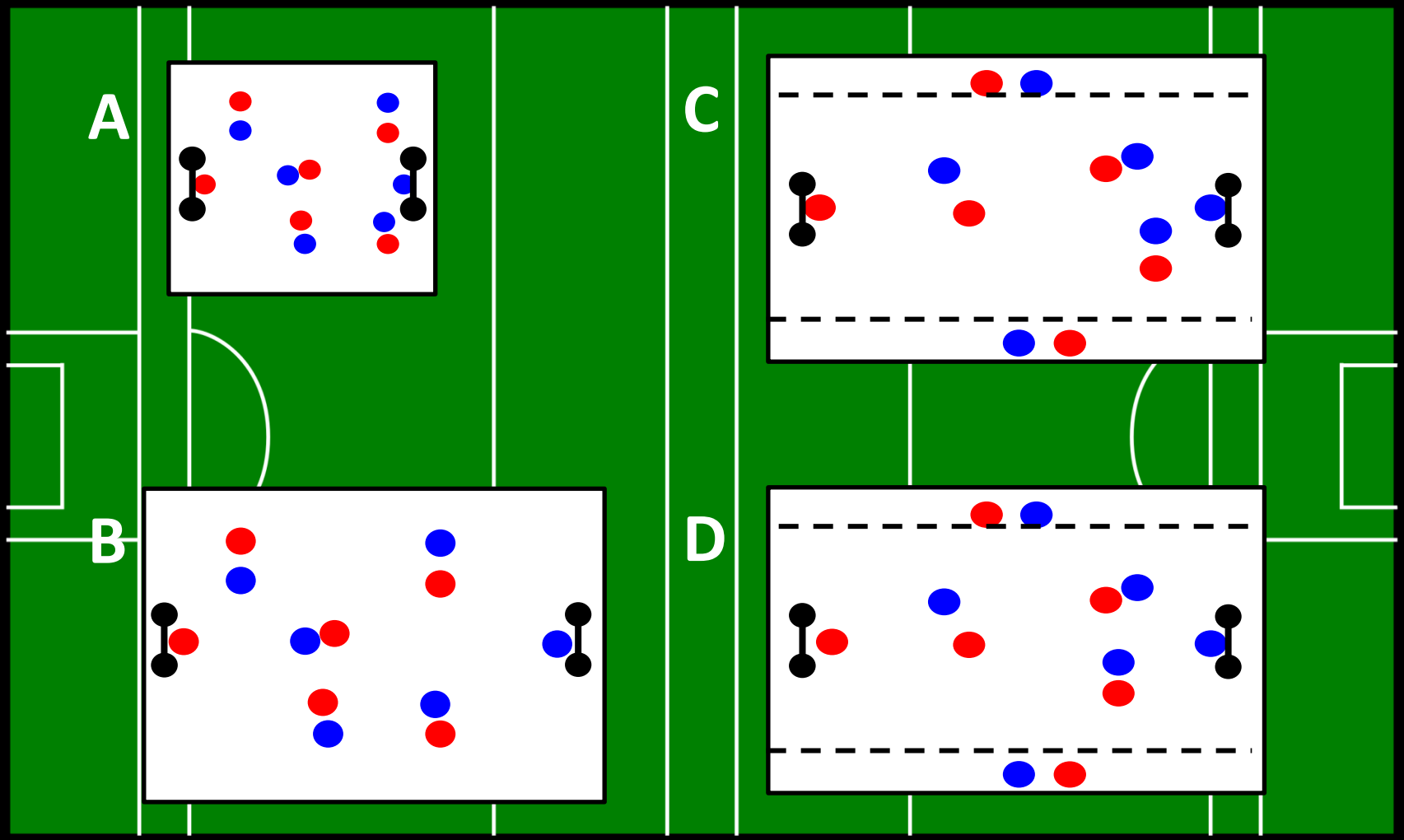


Space Time Task Equipment Players

Start-Stop Activity

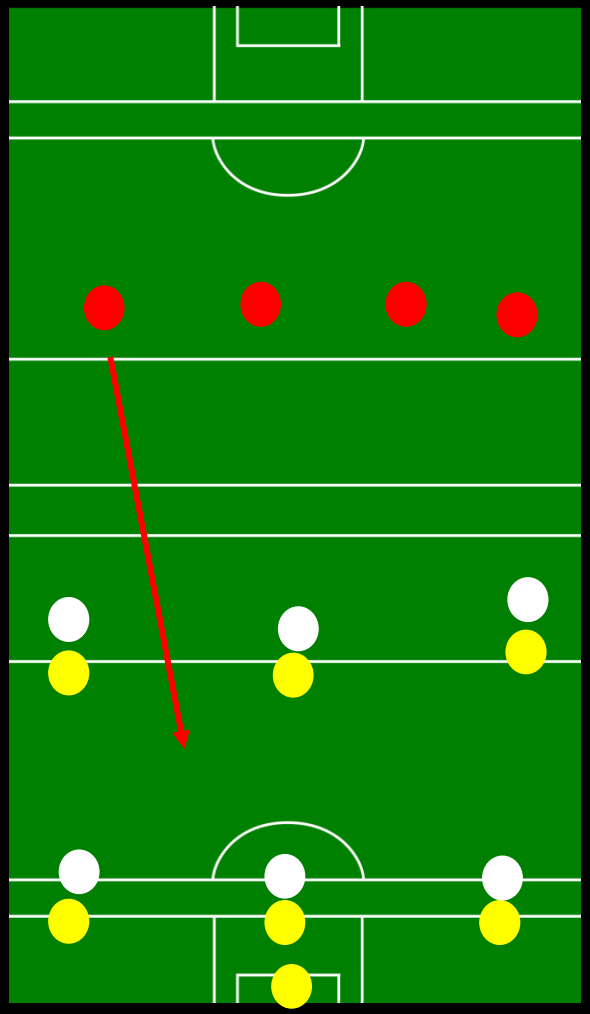


Sprinting



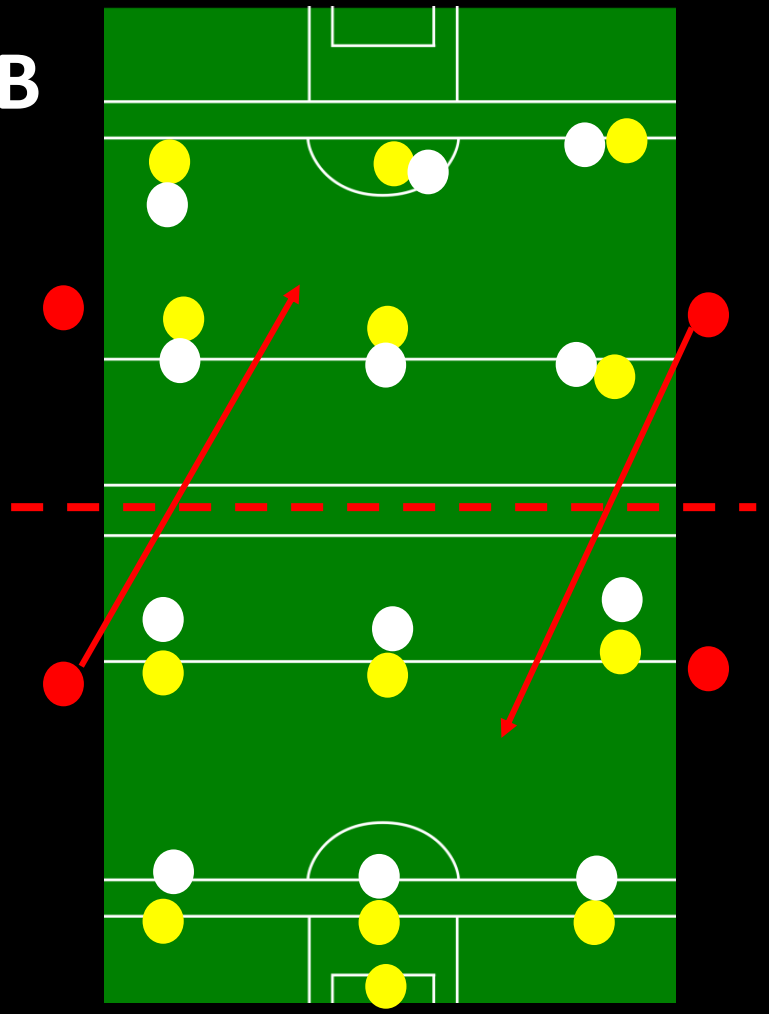
Maximal Intensity Periods

A



Backs v Forwards

B



Backs v Forwards

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Damien Young 16.4.20

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THANK YOU

The Match-Play Demands of Hurling

3 years in the making

Dr. Damien Young