Julien ROBINEAU

Préparateur physique équipe de France à 7

Analyse de la tâche

Cas concrets de Planification

Formation 7

Plan de la discussion

- Analyse de la tâche et exigences physiques
- Entraînements combinés
- Principes de planification
- Cas concrets : planification, échauffements …

Analyse de la tâche

	Temps de jeu	Distance totale (m)	Walk (m)	Footing (m)	Run (m)	Sprint (m)	Hte intensité (m)	%
Centre	14	1460	489	567	379	25	404	28
Centre 1/2 ouverture	14	1650	508	507	568	67	635	38
1/2 mêlée	14	1585	614	434	426	111	537	34
Talonneur	14	1346	537	382	400	27	427	32
Pilier G	13	1493	580	349	564	0	564	38
Pilier D 1/2 ouverture								
Pilier G	1	235	172	35	28	0	28	12
Pilier D	14	1504	528	493	480	3	483	32
Ailier	2	849	264	289	282	13	295	35
Ailier	12	1336	683	293	278	82	361	27

Données non publiées
Tournoi IRB - Londres 2014

- Homogénéité des postes

Analyse de la tâche

	Acc >2,5m/s² (nb)	Acc >3,5m/s² (nb)	Acc >4,5m/s² (nb)	Total Acc (nb)	Nbre EHI
Centre	12	1	0	13	40
Centre					
1/2 ouverture	6	0	0	6	26
1/2 mêlée	8	3	0	11	36
Talonneur	6	1	0	7	31
Pilier G	7	1	0	8	28
Pilier D					
1/2 ouverture					
Pilier G	1	0	0	1	5
Pilier D	14	4	0	18	36
Ailier	1	0	0	1	24
Ailier	6	0	1	7	25

Données non publiées
Tournoi IRB - Londres 2014

- Homogénéité des postes
- 25 à 40 efforts de haute intensité

Analyse de la tâche

REVIEW ARTICLE

Match Analysis and Player Characteristics in Rugby Sevens

Alex Ross · Nicholas Gill · John Cronin

Table 1 Summary of movement patterns of rugby sevens players and rugby union backs and loose forwards during competition using GPS

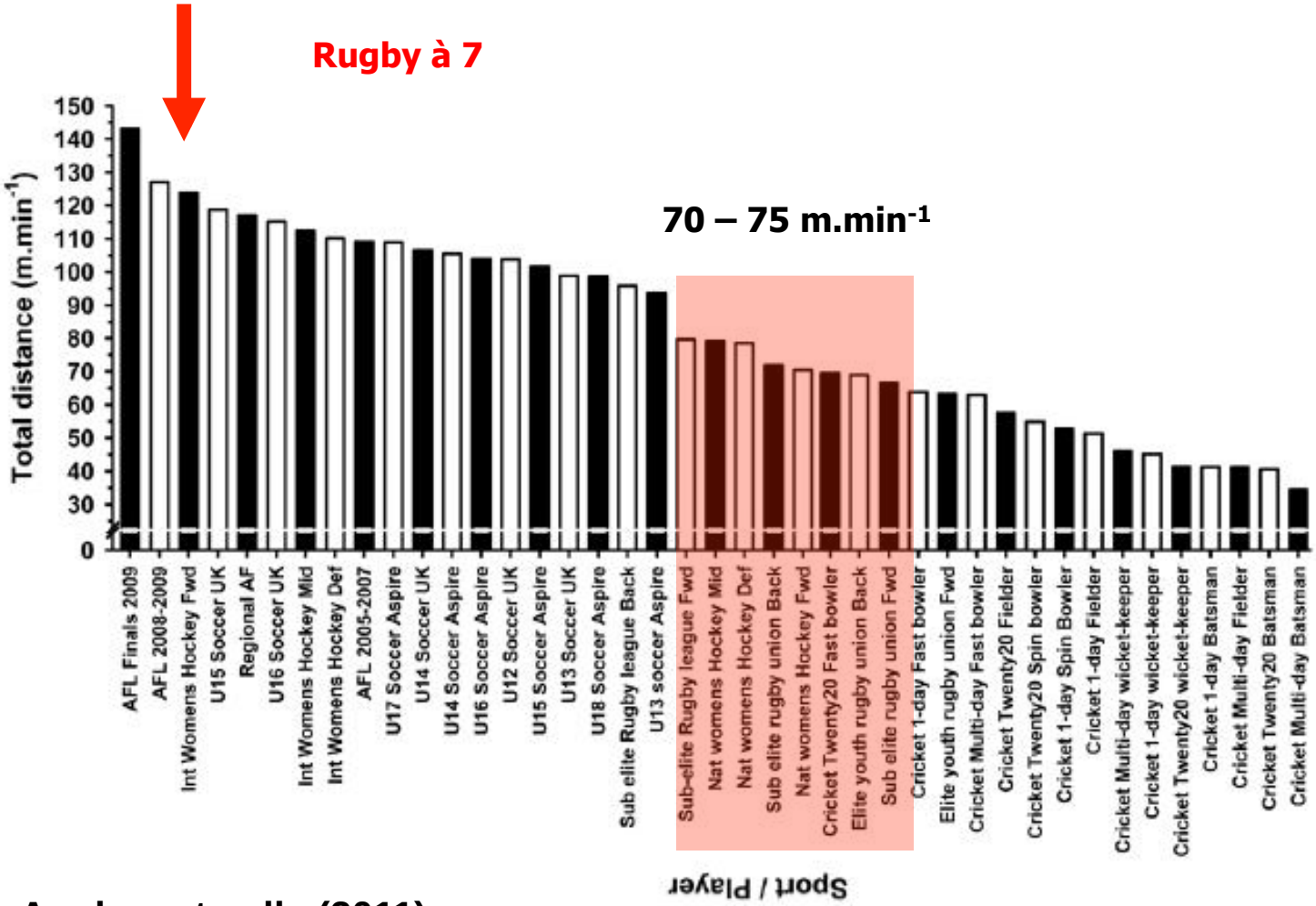
Study (years)	Subjects (*n*)	Position	TD (m min^{-1})	% TD high intensity running
Cahill et al. [15] (2013)	Elite 15s (216)	Back (151)	71	~13[a]
		Loose forward (65)	65	~16[a]
Coughlan et al. [24] (2011)	Elite 15s (1)	Back	73	~9[b]
Cunniffe et al. [29] (2009)	Elite 15s (1)	Back	72	~11[b]
Higham et al. [2] (2011)	International 7s (18)	NS	120	~19[b]
Suárez-Arrones et al. [1] (2012)	Domestic 7s (7)	NS	113	~14[b]
Suárez-Arrones et al. [30] (2012)	Domestic 15s (7)	NS	81	~13[b]

7s rugby sevens, *15s* rugby union, *m min*$^{-1}$ meters per minute, *NS* not specified, *TD* total distance

[a] ≥51 % of maximal velocity reached during a match

[b] ≥5 m s^{-1}

Analyse de la tâche

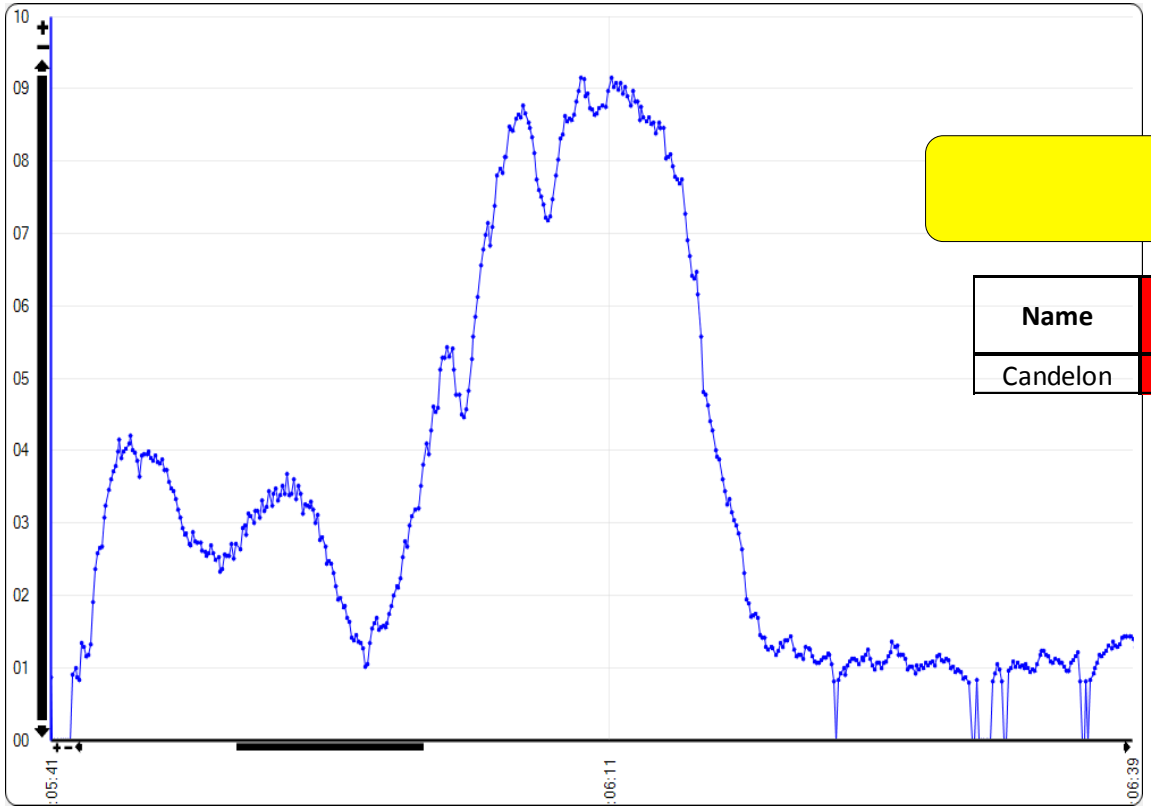


Aughey et coll., (2011)

Exigences physiques et physiologiques

Lactatémie *(travaux d'Anthony Couderc)*

Etude menée au tournoi de Lyon - FIRA



[La] : 19,3 mmol·L^{-1}

Name	Vmax	Distance totale parcourue	m.min-1
Candelon	9,16	258	171

Données tirées des 1'30 dernières minutes avant coaching

Exigences physiques et physiologiques

Aérobie

Capacité à répéter les efforts

Anaérobie lactique

Exigences physiques et physiologiques

The Yo-Yo Intermittent Recovery Test

A Useful Tool for Evaluation of Physical Performance in Intermittent Sports

Jens Bangsbo,[1] *F. Marcello Iaia*[1,2] and *Peter Krustrup*[1]

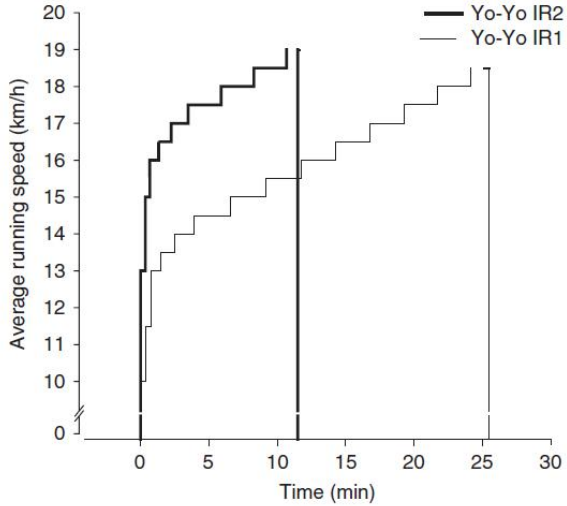
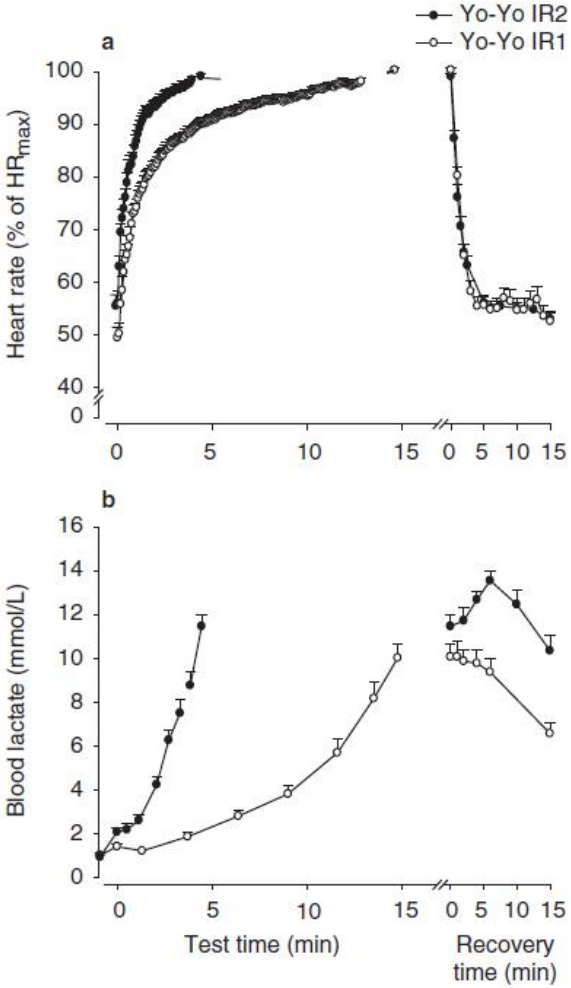


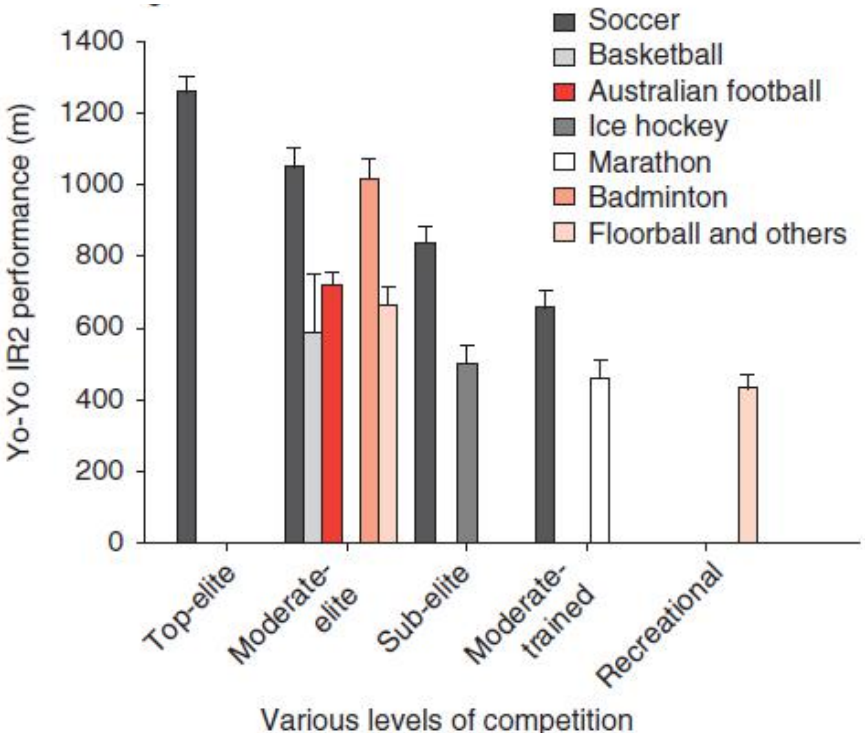
Fig. 1. Schematic representation of the Yo-Yo intermittent recovery level 1 (Yo-Yo IR1) and level 2 (Yo-Yo IR2) tests (reproduced from Krustrup et al.,[15,17] with permission).

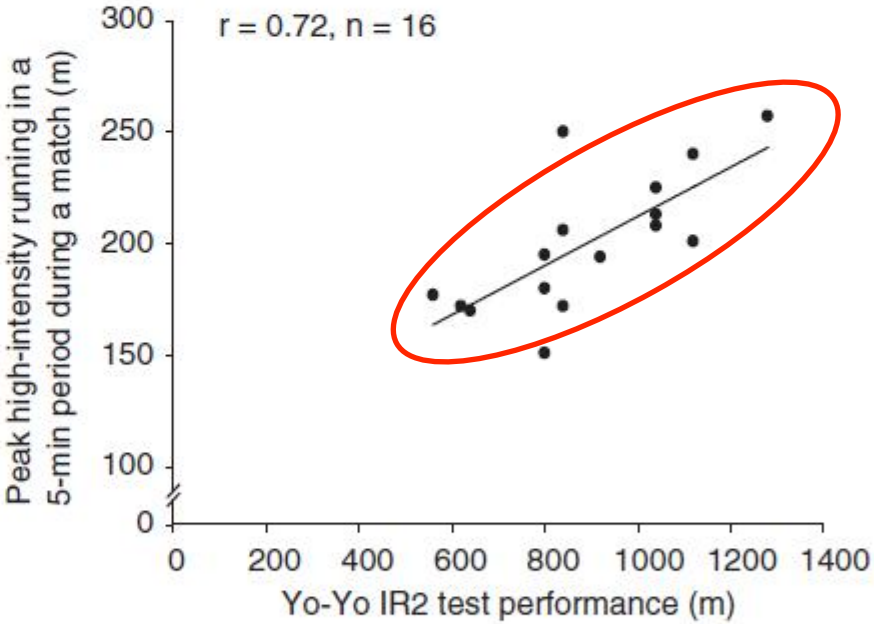


- Spécifique
- Sollicitation mixte aérobie / anaérobie
- Niveau de performance / activité haute intensité

Exigences physiques et physiologiques

Bangsbo et coll. (2008)





Exigences physiques et physiologiques

Table I. Change in Yo-Yo intermittent recovery level 1 (Yo-Yo IR1) and level 2 (Yo-Yo IR2) test performance as an effect of training/de-training in different sports

Study	n	Sport/level/gender	Training type/protocol/period	Frequency (no. sessions	Duration (no. of	Yo-Yo IR test distance (m)	Yo-Yo IR test performance	VO_{2max} (mL/min/kg)	Change (%)
Yo-Yo IR2									
Hasegawa[24]	16	Professional male football players	Daily football practice		10	717 ± 33	+52.3*		
Krustrup et al.[17]	20	Sub-elite male soccer players	End of season/de-training after summer holidays	0–1	4	873 ± 43	−11 ± 5*		
	15	Elite male soccer players	Soccer training Pre-season preparation	5–7	8	730 ± 41	+42 ± 8*		
Unpublished observation	10	Elite male soccer players	Soccer training Pre-season preparation	6–7	6	1116 ± 62	+13.5*		
McHughes et al.[27]	16	Professional male soccer players	Soccer training Pre-season preparation			911 ± 58	+18.4*		

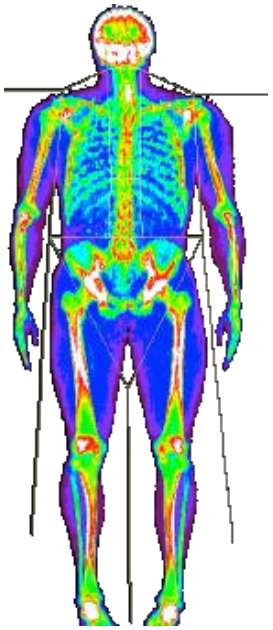
Pertinence de VMA et Yoyo test

	VMA	Yoyo test
1/2 ouverture	18,3	640
Centre	17,15	840
1/2 mêlée	18,3	1040
Ailier	17,3	
Talonneur	17,5	1000
Ailier	16,7	
Pilier G	17,7	920
Ailier	18	
Pilier D	17,3	1000
1/2 ouverture	17,1	
Pilier G		1080
Ailier	15,7	
Pilier D	16,3	760
1/2 mêlée		1120
1/2 ouverture	16,7	

Travail anaérobie lactique

Travail musculaire

Exigences physiques et physiologiques



Sommaire de résultats DXA :

Région	CMO (g)	Graisse (g)	Maigre (g)	MM+CMO (g)	Masse totale (g)	% Graisse
Bras G	325.08	265.0	5795.1	6120.2	6385.2	4.2
Bras D	345.65	394.8	5725.7	6071.3	6466.1	6.1
Tronc	1383.45	4121.4	40868.6	42252.0	46373.4	8.9
Jambe G	859.16	773.4	13285.2	14144.4	14917.8	5.2
Jambe D	860.56	1038.4	13768.0	14628.5	15667.0	6.6
Subtotal	3773.90	6593.1	79442.5	83216.4	89809.5	7.3
Tête	602.55	969.6	3753.6	4356.1	5325.8	18.2
Total	**4376.45**	**7562.7**	**83196.1**	**87572.6**	**95135.2**	**7.9**

TBAR2185

Analyse de la tâche – Fatigue ?

Though it appears fatigue does not affect movement patterns between games, researchers have suggested that fatigue may impact movement patterns within games.

Ross et coll. 2013

Table 2
First and second half movement patterns of players that contested a full match.

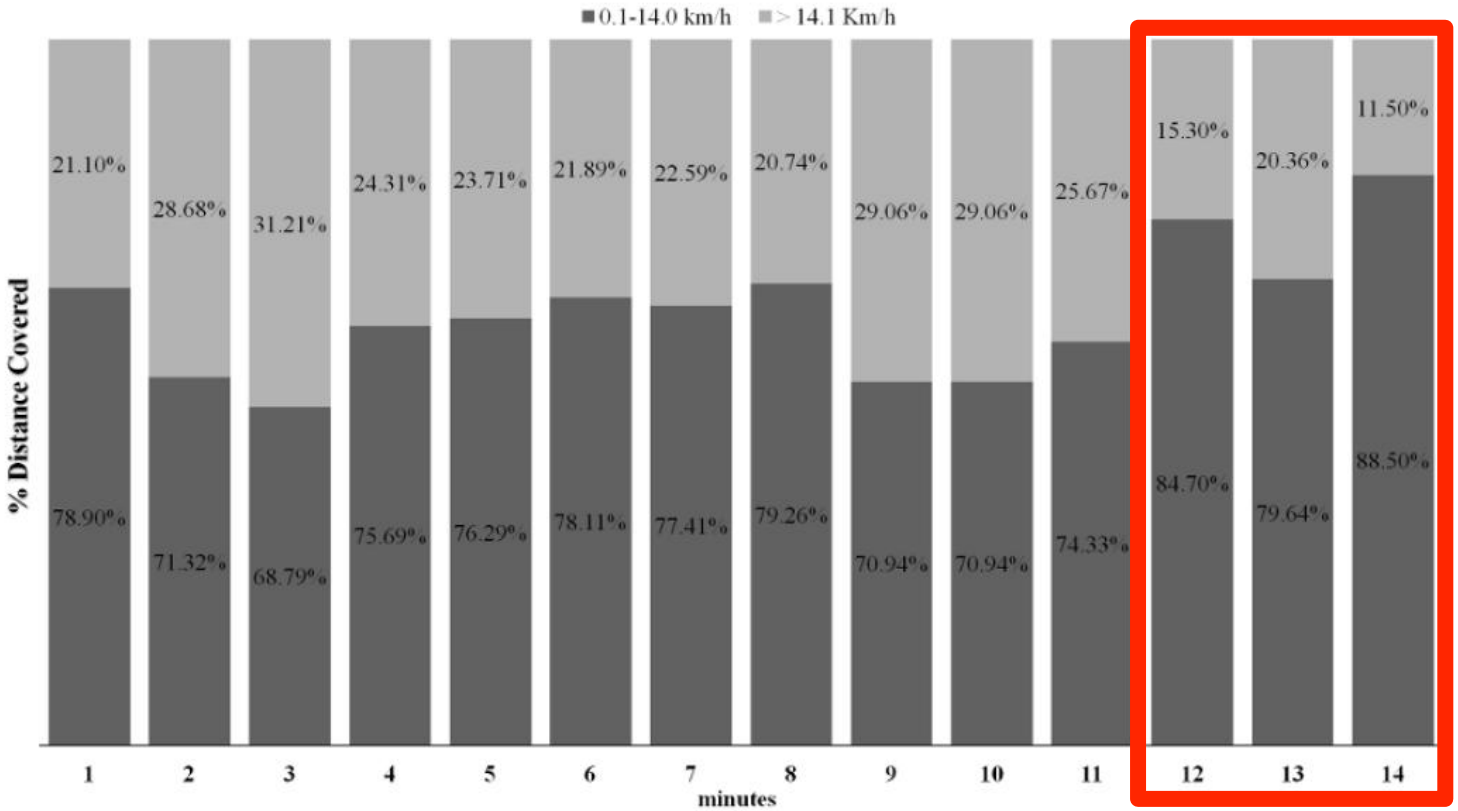
	1st Half ($n=71$)	2nd Half ($n=71$)			
	Mean ± SD	Mean ± SD	%change ± 90% CL	Standardised change ± 90% CL	Qualitative outcome
Relative distance (m min^{-1})	120 ± 19	113 ± 16	−5.3 ± 4.2	−0.37 ± 0.28	Small −
Max. velocity (m s^{-1})	7.9 ± 1.1	7.9 ± 1.2	0.2 ± 4.0	0.01 ± 0.28	Unclear
≥6 m s^{-1} m min^{-1}	10.7 ± 6.9	9.5 ± 6.0	−7 ± 23	−0.09 ± 0.28	Unclear
5–6 m s^{-1} m min^{-1}	9.9 ± 4.5	9.0 ± 3.8	−10 ± 15	−0.22 ± 0.28	Small −
3.5–5 m s^{-1} m min^{-1}	24.8 ± 7.1	22.9 ± 6.2	−7.7 ± 8.5	−0.27 ± 0.28	Small −
2–3.5 m s^{-1} m min^{-1}	33.0 ± 7.8	30.3 ± 7.8	−8.8 ± 7.4	−0.36 ± 0.28	Small −
0–2 m s^{-1} m min^{-1}	41.3 ± 8.1	41.6 ± 6.0	1.5 ± 4.9	0.09 ± 0.28	Trivial +
Moderate accelerations min^{-1}	1.0 ± 0.4	0.9 ± 0.5	−14 ± 15	−0.30 ± 0.28	Small −
High accelerations min^{-1}	0.4 ± 0.3	0.4 ± 0.3	−16 ± 21	−0.27 ± 0.29	Small −
Moderate decelerations min^{-1}	1.3 ± 0.5	1.3 ± 0.5	−1 ± 14	−0.03 ± 0.28	Unclear
High decelerations min^{-1}	0.3 ± 0.2	0.3 ± 0.2	−13 ± 19	−0.23 ± 0.29	Small −

+ or − indicates an increase or decrease from the first to second half. Moderate accelerations and decelerations were defined as a change in velocity between 2 to 4 and −4 to −2 m s^{-2}, respectively. High accelerations and decelerations were defined as a change in velocity >4 and <−4 m s^{-2}, respectively. n = number of match files; CL = confidence limits.

Higham et coll, 2011

- Pas de fatigue Match 1 à Match 6
- Fatigue ponctuelle MT1 à MT2

Analyse de la tâche – Fatigue ?



Fatigue accrue au cours des trois dernières minutes de jeu (Granatelli et coll., 2013)

➢ **Impact sur le coaching ???**

Analyse de la tâche – Fatigue ?

Movement patterns in rugby sevens: Effects of tournament level, fatigue and substitute players

Dean G. Higham [a,b,c,*], David B. Pyne [a,b], Judith M. Anson [d], Anthony Eddy [c]

Table 3
Second half movement patterns of players that contested a full match and substitute players on the field for less than 4 min.

	Full Match ($n = 71$)	Substitute ($n = 12$)			
	Mean ± SD	Mean ± SD	%difference ± 90% CL	Standardised difference ± 90% CL	Qualitative outcome
Relative distance (m min^{-1})	113 ± 16	140 ± 14	24 ± 6	1.69 ± 0.47	Large +
Max. velocity (m s^{-1})	7.9 ± 1.2	8.1 ± 1.4	1.8 ± 9.6	0.11 ± 0.57	Unclear
≥6 m s^{-1} m min^{-1}	9.5 ± 6.0	20.8 ± 12.6	123 ± 43	1.16 ± 0.51	Moderate +
5–6 m s^{-1} m min^{-1}	9.0 ± 3.8	17.7 ± 5.8	110 ± 21	1.75 ± 0.44	Large +
3.5–5 m s^{-1} m min^{-1}	22.9 ± 6.2	26.1 ± 7.8	14 ± 18	0.43 ± 0.54	Small +
2–3.5 m s^{-1} m min^{-1}	30.3 ± 7.8	31.2 ± 8.9	3 ± 17	0.10 ± 0.55	Unclear
0–2 m s^{-1} m min^{-1}	41.6 ± 6.0	44.4 ± 7.5	6.3 ± 9.6	0.38 ± 0.57	Small +
Moderate accelerations min^{-1}	0.9 ± 0.5	1.4 ± 0.4	74 ± 20	1.24 ± 0.41	Large +
High accelerations min^{-1}	0.4 ± 0.3	0.5 ± 0.4	85 ± 42	0.95 ± 0.54	Moderate +
Moderate decelerations min^{-1}	1.3 ± 0.5	1.6 ± 1.0	28 ± 45	0.42 ± 0.64	Unclear
High decelerations min^{-1}	0.3 ± 0.2	0.3 ± 0.3	89 ± 27	1.28 ± 0.48	Large +

+ indicates an increase in substitutes over full-match players. Moderate accelerations and decelerations were defined as a change in velocity between 2 to 4 and −4 to −2 m s^{-2}, respectively. High accelerations and decelerations were defined as a change in velocity >4 and <−4 m s^{-2}, respectively. n = number of match files; CL = confidence limits.

- « Impact player » si joue moins de 4 min

Analyse de la tâche – Fatigue ?

Profiling the time-course changes in neuromuscular function and muscle damage over two consecutive tournament stages in elite rugby sevens players

Daniel J. West [d], Christian J. Cook [b,c], Keith A. Stokes [e], Pete Atkinson [b], Liam P. Kilduff [a]

Conclusions

A single sevens tournament reduces NMF such that players are not fully recovered by the start of the second competition stage, however CK returns to baseline in-between and shows the same pattern across two consecutive tournaments.

- **Fatigue Jour 1 et 2 … puis tournoi 1 et 2**
- **Fatigue neuromusculaire / Traumatique**
- **Impact sur les phases de combat / Explosivité**

Exigences physiques et physiologiques

Table 2 Summary of studies reporting anthropometric characteristics of rugby sevens players

Study (years)	Subjects (*n*)	Position	Height (cm)	Mass (kg)	Body composition
Elloumi et al. [5] (2012)	International (16)	NS	183 ± 0.10	87.3 ± 7.4	11.3 %[a]
Fuller et al. [8] (2010)	International (264)	Back (162)	180 ± 6.40	86.0 ± 7.80	NR
		Forward (88)	187 ± 5.80	97.7 ± 7.20	NR
		NS (14)	183 ± 7.10	90.1 ± 9.50	NR
Higham et al. [2] (2012)	International (19)	NS	182 ± 0.50	89.7 ± 7.30	NR
Higham et al. [6] (2013)	International (18)	NS	183 ± 0.06	89.7 ± 7.60	52.2 mm[b]
Rienzi et al. [3] (1999)	International (30)	Back (13)	176 ± 5.10	78.6 ± 7.10	11.4 %[a]
		Forward (17)	185 ± 4.60	93.5 ± 7.80	12.1 %[a]
Suárez-Arrones et al. [1] (2012)	Domestic (7)	NS	180 ± 7.80	87.9 ± 11.0	61.6 mm[b]
Takahashi et al. [9] (2006)	International (7)	NS	179 ± 7.90	86.4 ± 8.40	NR

Anthropometric values are expressed as mean ± SD

NR not reported, *NS* not specified

[a] Estimated body fat percentage according to sum of four skinfolds (supra-iliac, biceps, triceps, and sub-scapular)

[b] Sum of seven skinfolds (biceps, triceps, subscapular, suprailiac, abdomen, front thigh, and medial calf)

Exigences physiques et physiologiques

Neuromusculaires

Vitesse

Puissance

Force

Analyse de la tâche

- 20 à 40 phases de combat / tournoi

- 4 à 7 phases de combat / match

	Acc >2,5m/s² (nb)	Acc >3,5m/s² (nb)	Acc >4,5m/s² (nb)	Total Acc (nb)	Nbre EHI
Centre	12	1	0	13	40
Centre					
1/2 ouverture	6	0	0	6	26
1/2 mêlée	8	3	0	11	36
Talonneur	6	1	0	7	31
Pilier G	7	1	0	8	28
Pilier D					
1/2 ouverture					
Pilier G	1	0	0	1	5
Pilier D	14	4	0	18	36
Ailier	1	0	0	1	24
Ailier	6	0	1	7	25

Données non publiées
Tournoi IRB - Londres 2014

- 20 à 40 actions de haute intensité / match

Exigences physiques et physiologiques

	1RM DC (kg)	1RM TC (kg)	FMI squat	CMJ	10m	20m	50m	80m
1/2 ouverture	105	80	198	43	1,61	2,81	6,1	9,38
Centre	135	115	183	43,5	1,56	2,7	5,9	9
1/2 mêlée	110	105	0		1,61	2,8	6	9,13
Ailier	125	115	215	44,1	1,66	2,86	6,2	9,54
Talonneur	130		198	41,5	1,56	2,75	6,03	9,38
Ailier	120	105	174	55,5	1,61	2,79	5,87	9,02
Pilier G	125	105	175	55	1,59	2,76	5,99	9,31
Ailier	95	100	182	41,1	1,62	2,79	5,99	9,18
Pilier D	140	130	190	43,4	1,56	2,8	6,11	9,49
1/2 ouverture	130	117,5						
Pilier G	135	115			1,64	2,85	6,28	9,74
Ailier				47,9	1,55	2,69	5,88	9,07
Pilier D	145	117,5	205	45,2	1,64	2,92	6,48	10,09
1/2 mêlée					1,69	2,9	6,29	9,67
1/2 ouverture	120	105	187	47,6	1,58	2,76	5,96	9,26

Données non publiées
Août 2013

- Force < Rugby à 15

- Puissance et vitesse > Rugby à 15

Vitesse

- Vitesse spécifique (anecdotes)

- Coordination / Dissociation → Echelle de rythme
- Agilité / Vivacité → petit périmètre / Test « T »
- Induire geste technique

- Spécifique au poste (avants / TQ)
- Duels en poursuite
- Duels frontaux

Exigences physiques et physiologiques

Oxydatives

Capacité à répéter les efforts

Anaérobie lactique

Neuromusculaires

Vitesse

Puissance

Force

Problématique des entraînements combinés

Aérobie

Force / Vitesse / Puissance

Compatibilité des efforts

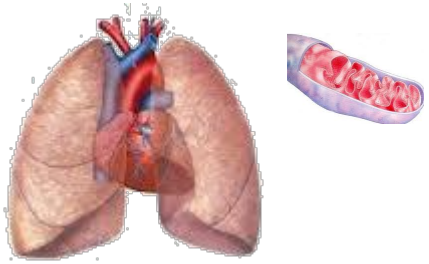
Nombre important de contractions

Tensions musculaires de faible intensité

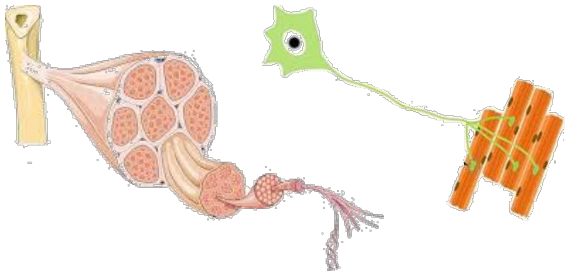
Faible nombre de contractions

Tensions musculaires de haute intensité

Adaptations cardiorespiratoires et musculaires



Adaptations nerveuses et musculaires



???

Transfert et utilisation de l'oxygène, …

Hypertrophie musculaire

Recrutement des unités motrices, …

Compatibilité des qualités ?

European Journal of
Applied Physiology
and Occupational Physiology
© Springer-Verlag 1980

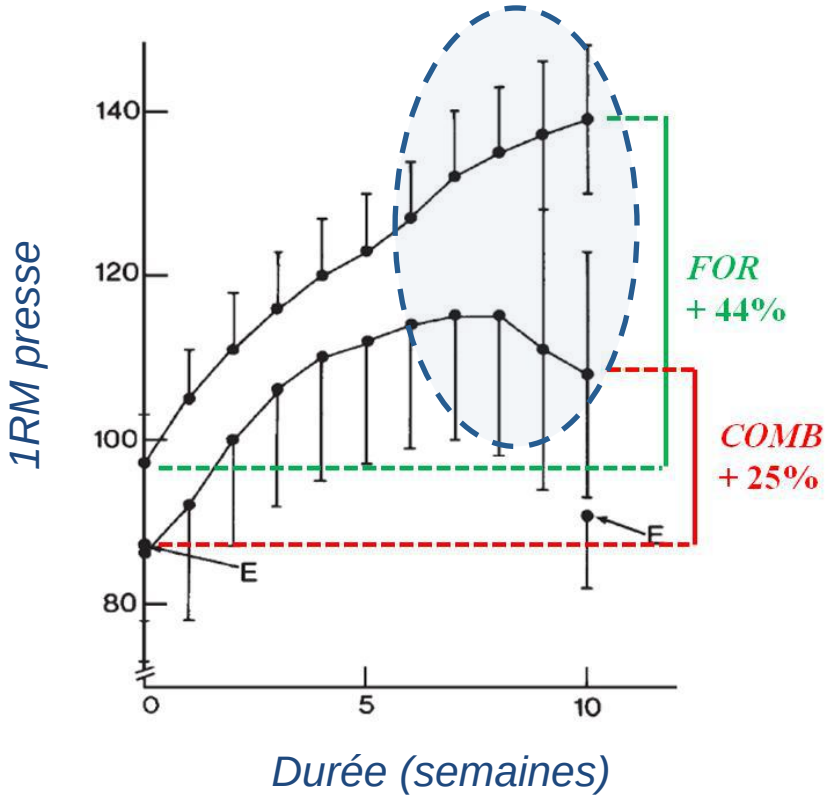
Interference of Strength Development by Simultaneously Training for Strength and Endurance

Robert C. Hickson (1980)

10 semaines d'entraînement

3 groupes expérimentaux

1. FOR Fmax
   5 séances/semaine
2. AER INT et CONT
   6 séances/semaine
3. COMB 11 séances/semaine



Origine musculaire

Mécanismes explicatifs de l'interférence

1. Fatigue

- **Fatigue induite par l'endurance sur la production de force**

Altération du volume de travail

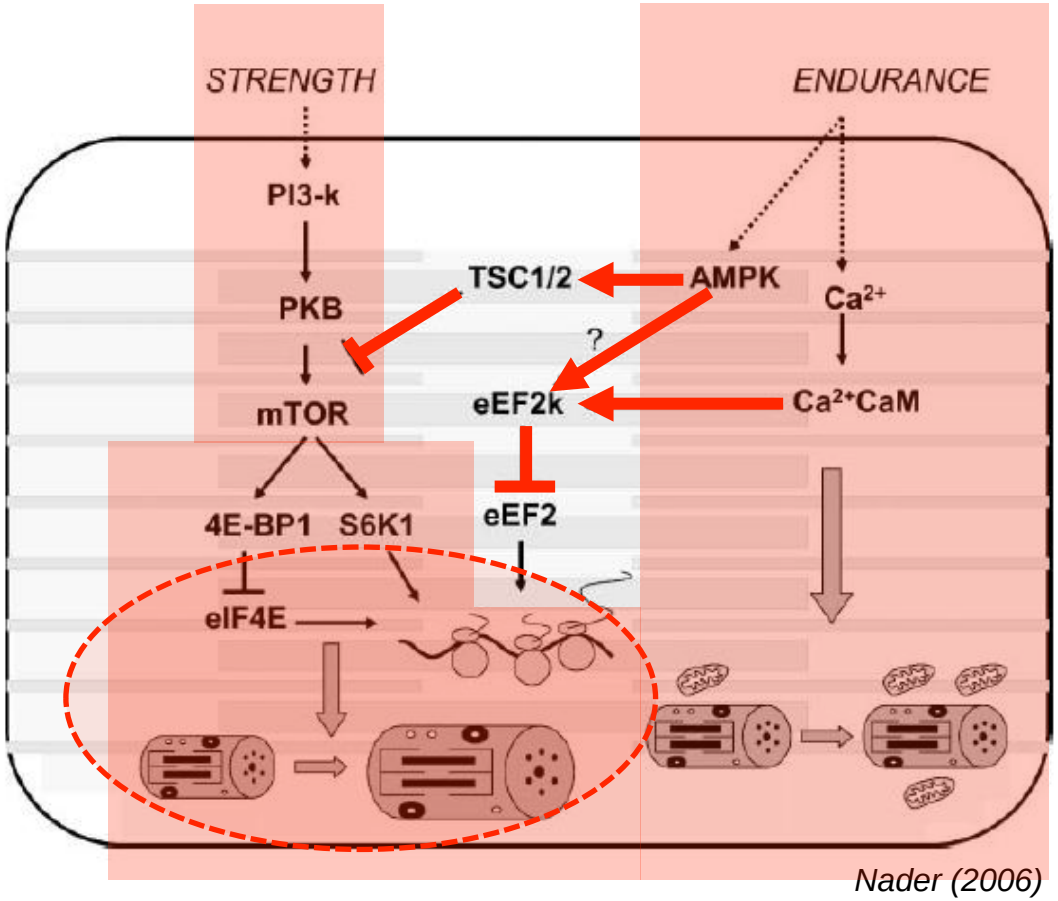
Perturbation des adaptations neuromusculaires

Mécanismes explicatifs de l'interférence

2. Adaptations physiologiques conflictuelles

Hypertrophie des fibres musculaires (Kraemer et coll. 1995)

Altération de la synthèse protéique



Nader (2006)

Mécanismes explicatifs de l'interférence

1. Fatigue induite par une séance sur la production de force

2. Adaptations physiologiques conflictuelles

Lutter contre cette interférence

CONCURRENT TRAINING: A META-ANALYSIS EXAMINING INTERFERENCE OF AEROBIC AND RESISTANCE EXERCISES

JACOB M. WILSON,[1] PEDRO J. MARIN,[2,3] MATTHEW R. RHEA,[4] STEPHANIE M.C. WILSON,[1] JEREMY P. LOENNEKE,[5] AND JODY C. ANDERSON[1]

Volume d'entraînement

1 séance endurance/semaine
< 30 min

Répétition de sprint

Type de séance

INTERFERENCE

Ordre des séances

FOR / AER

Récupération

6h voire 24h

Lutter contre cette interférence

Maximal strength, power, and aerobic endurance adaptations to concurrent strength and sprint interval training

Gregory S. Cantrell · Brian K. Schilling ·
Max R. Paquette · Zsolt Murlasits

Table 2 Pre-, mid-, and post-testing 1RM values for upper and lower body

	Group	Pre-test	Mid-test	Post-test
Bench press (kg)*	ST	96.0 ± 11.5	103.6 ± 12.0	107.7 ± 10.8
	CT	98.4 ± 22.2	107.6 ± 22.8	111.1 ± 22.8
Back squat (kg)*	ST	115.3 ± 13.9	135.7 ± 17.7	153.1 ± 19.1
	CT	114.4 ± 24.1	132.6 ± 28.1	147.6 ± 32.7

Conclusion Preliminary findings suggest that performing concurrent sprint interval and strength training does not attenuate the strength response when compared to ST alone, while also improves aerobic performance measures, such as VO_2max at the same time.

Lutter contre cette interférence

CONCURRENT TRAINING: A META-ANALYSIS EXAMINING INTERFERENCE OF AEROBIC AND RESISTANCE EXERCISES

JACOB M. WILSON,[1] PEDRO J. MARIN,[2,3] MATTHEW R. RHEA,[4] STEPHANIE M.C. WILSON,[1] JEREMY P. LOENNEKE,[5] AND JODY C. ANDERSON[1]

Volume d'entraînement

1 séance endurance/semaine
< 30 min

Répétition de sprint

Type de séance

INTERFERENCE

Ordre des séances

FOR / AER

Récupération

6h voire 24h

Lutter contre cette interférence

Volume d'entraînement

Type de séance

INTERFERENCE

Ordre des séances

Récupération

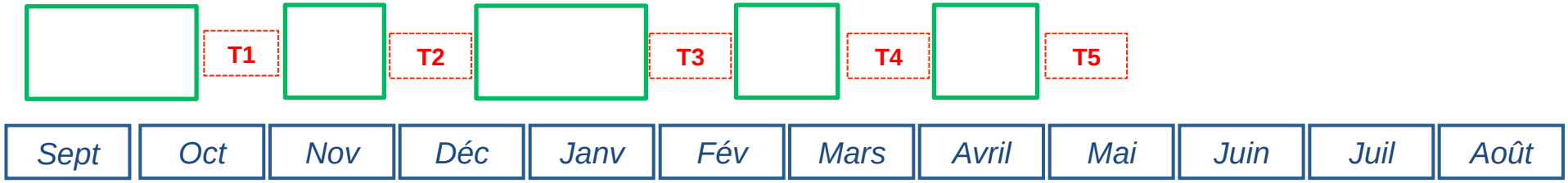
- Travailler de manière traditionnelle ?

Périodisation par bloc (Bondarchuk, 1985)

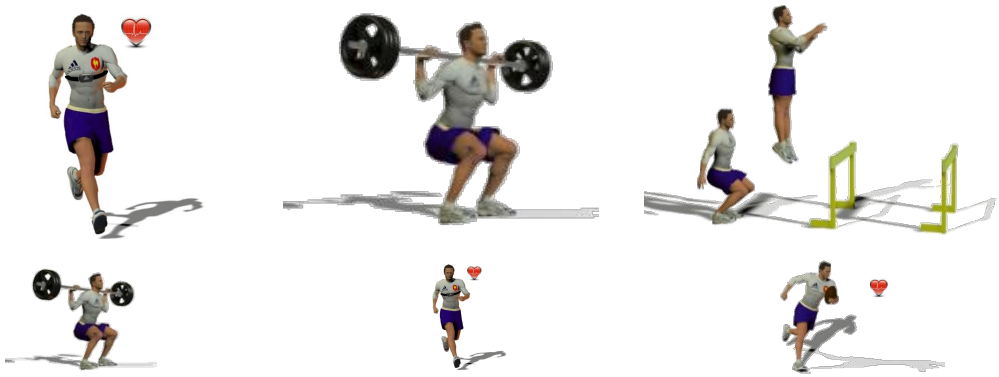
Périodisation par bloc

Format de compétition du rugby à 7

Objectifs à moyen terme / cycle de 4 à 8 semaines



Semaine 1 à 3	Semaine 4 à 6	Semaine 7 à 8
Aérobie	*Force*	*Puissance*



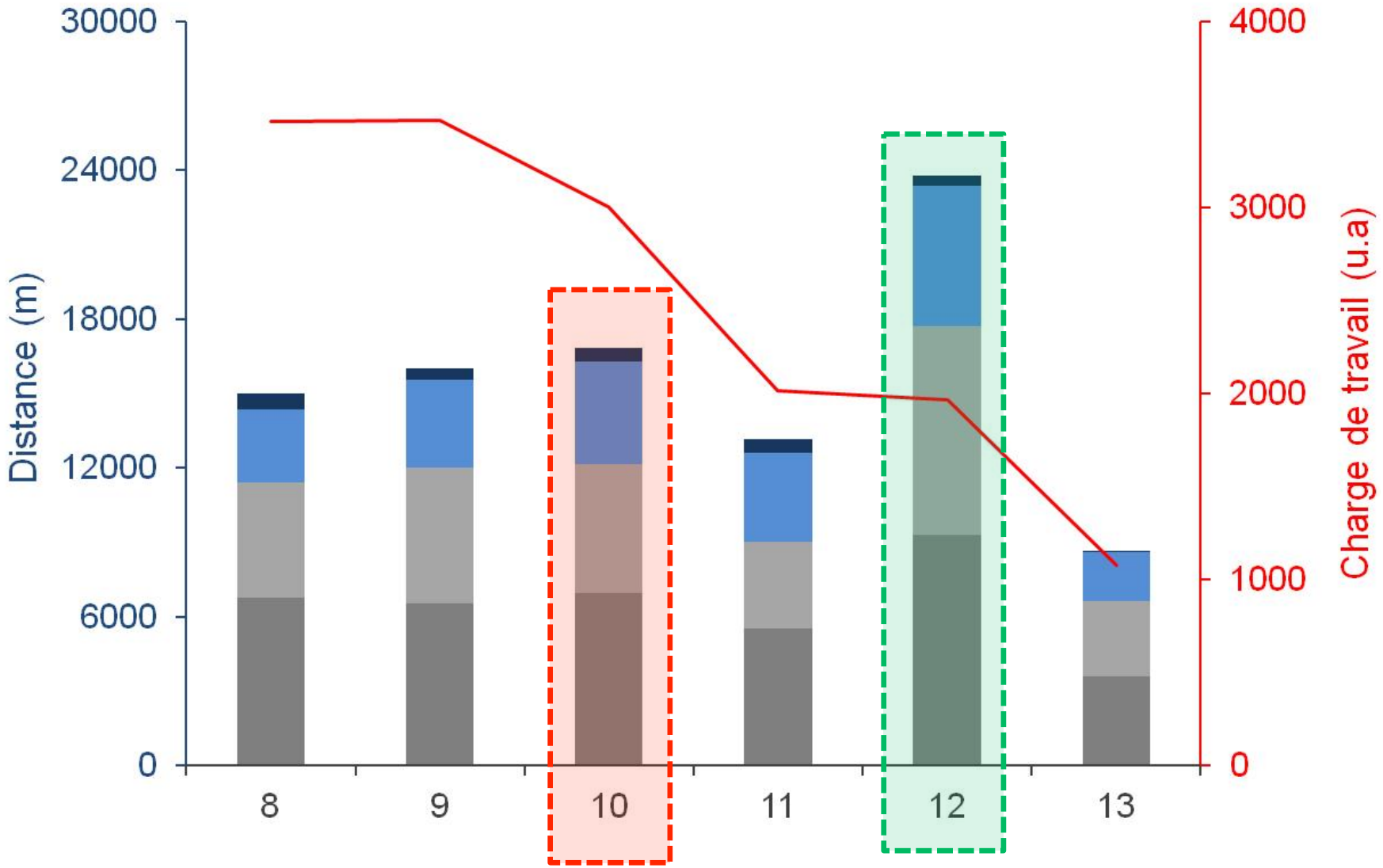
Principes de planification

- Périodisation par bloc

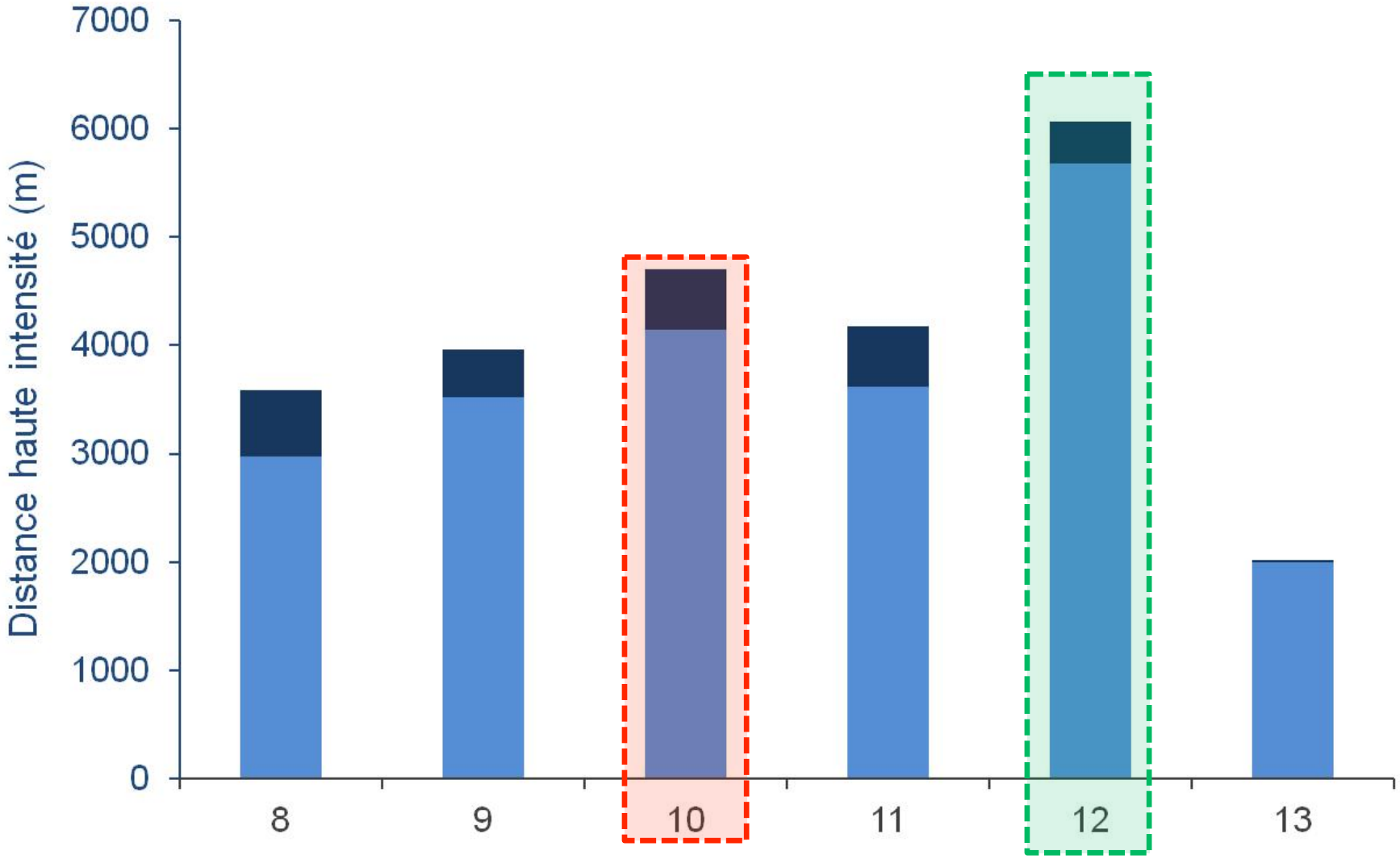
- Périodisation dense vs. Aérée

  Début de cycle vs. Affutage

Suivi de la charge de travail



Suivi de la charge de travail



Principes de planification

- Périodisation par bloc
- Périodisation dense vs. aérée
- Préparation physique intégrée

Aérobie

- Intermittent long et court

Début de saison / période de préparation

- Répétition de sprint

Préparation à la vitesse / Force

Fin de préparation

- Jeux-réduits

Période de compétition

Affutage

Repeated Sprints, High-Intensity Interval Training, Small-Sided Games: Theory and Application to Field Sports

James J. Hoffmann Jr, Jacob P. Reed, Keith Leiting, Chieh-Ying Chiang, and Michael H. Stone

Principes de planification

S-X à S-2 inclus

- 1 aérobie intégrée

Séquences de 2 min, R: 30 sec à 1 min

- 1 mixte lactique / aérobie

Par exemple : « australien » ou efforts type 30/35 sec

- 1 musculation orientée force explosive / puissance

Haltéro / pliométrie

- 1 vitesse longue spécifique (si prêts) + qqs sprints courts (~ 4)

6 à 8 sprints longs > 40 m

➢ S-2 : Pic de la charge de travail

Principes de planification

S-1 (début de l’affutage)

• 1 aérobie intégrée (plus petit volume)

Séquences de 1’30, R: 30 sec à 1 min / 7 à 10 m de largeur par joueur

• 1 lactique

Sprints d’~300m

• 1 musculation orientée force explosive / puissance

Haltéro / pliométrie

• 1 vitesse courte

10 sprints courts < 40 m

Principes de planification

Semaine de compétition

- 1 musculation orientée force explosive / puissance

Haltéro / pliométrie

- 1 rappel spécifique (H-72) : aérobie intégré

- 1 vitesse courte (H-48)

10 sprints courts < 40 m

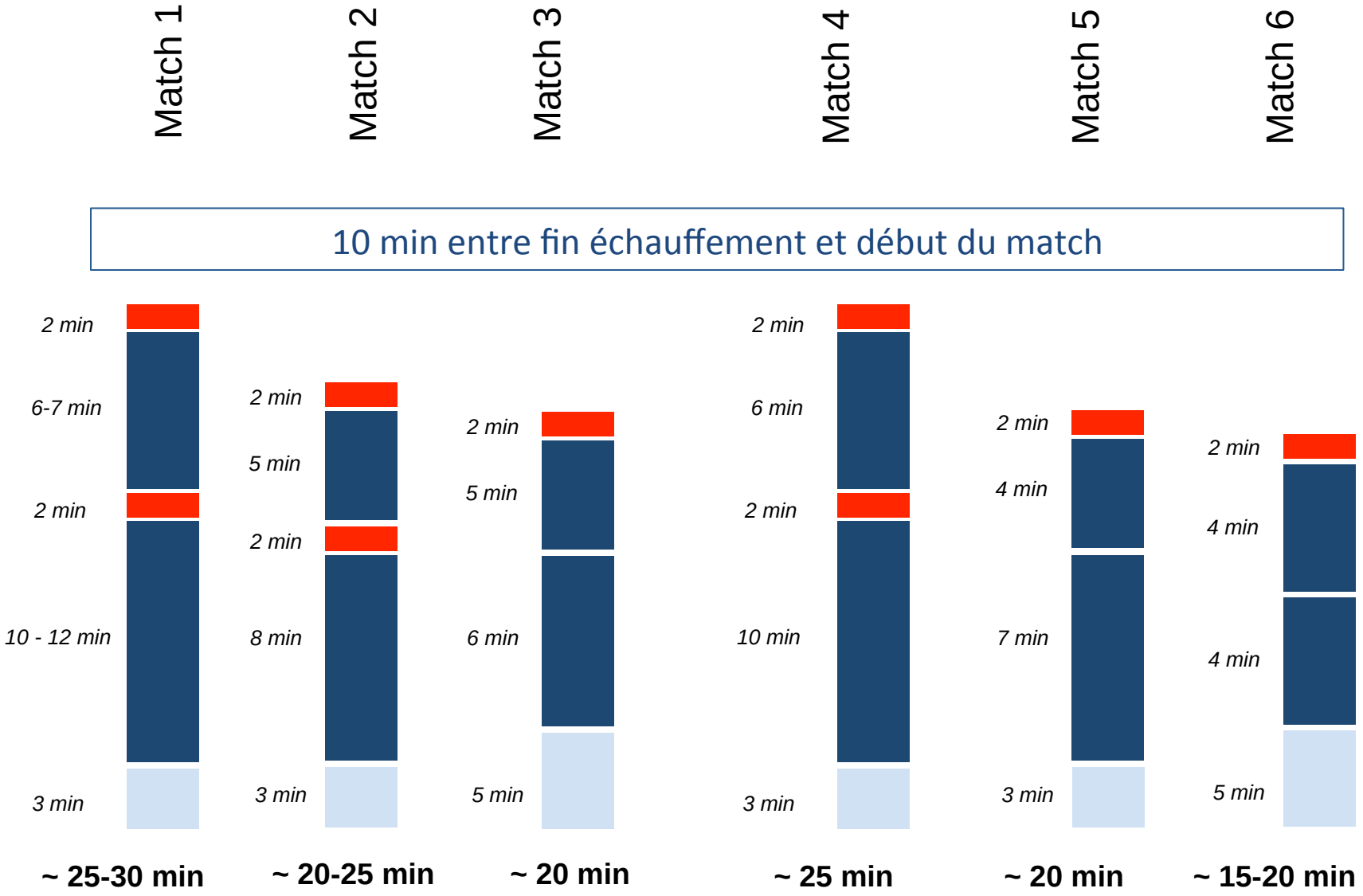
Principes de planification

BLOW OUT

- A base de répétition d’efforts (50 m voire +)
- Le temps d’une MT
- Intégration du technique
- Indispensable chez nos joueurs et joueuses …
- 2h30 avant le début de la compétition

Echauffement

10 min entre fin échauffement et début du match



Récupération

- Récupération active mais pas d’impact
- Cryothérapie par bain froid
- Massage / Piscine … individuel
- Et bien sûr la nutrition et le sommeil !!!

Aérobie

Factors Affecting Exercise Intensity in Rugby-Specific Small-Sided Games

David C. Kennett,[1] Tom Kempton,[1] and Aaron J. Coutts[1,2]

[1]*Sport and Exercise Discipline Group, UTS: Health, University of Technology, Sydney, Australia; and* [2]*Centre for Health Technologies, University of Technology, Sydney, Australia*

Table 1. Small-sided game variables.

	Small field			Large field		
	4 vs. 4	6 vs. 6	8 vs. 8	4 vs. 4	6 vs. 6	8 vs. 8
Duration (min)	2 × 9	2 × 9	2 × 9	2 × 9	2 × 9	2 × 9
Field area (m^2)	768	768	768	3,072	3,072	3,072
Field size (length × width)	32 × 24	32 × 24	32 × 24	64 × 48	64 × 48	64 × 48
Field ratio (length:width)	1.33:1	1.33:1	1.33:1	1.33:1	1.33:1	1.33:1
Area per player (m^2)	96	64	48	384	256	192
Rules	Modified touch football rules					
Encouragement	Yes					

Aérobie

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Procedures

The SSGs were played under modified touch football rules that are commonly used in rugby codes. The SSG required players to pass the ball backwards to a team mate in an 'onside' position. Each team was permitted to have 6 'plays' while in possession of the ball. Defending players were only required to touch their opponent with one hand. After a successful touch, play would restart with a 'play the ball.' The defensive line was set at 5 m from the position of each 'play the ball.' Each match consisted of two 9-minute halves that were separated by a 2-minute half-time period. The composition of teams, coach encouragement, and referee were standardized for all SSGs. In addition, all SSGs were played at the same time of the day (16:00–17:00), and the players were asked to standardize their food and fluid intake in the 24 hours before each testing day. The study was conducted from June to July, which was in the middle of the competitive rugby union season.

Aérobie

Table 2. Time-motion and physiological responses to the small-sided games (mean ± *SD*).

	Player number			Field size	
	4 vs. 4	6 vs. 6	8 vs. 8	Small	Large
Time-motion variables					
Speed ($m \cdot min^{-1}$)	114 ± 16*†	110 ± 15†	100 ± 16	94 ± 9‡	121 ± 10
HSR (m)	273 ± 179*†	199 ± 129†	153 ± 115	88 ± 49‡	316 ± 120
Sprints (n)	2.1 ± 2.4†	1.4 ± 1.8	1.0 ± 1.2	0.4 ± 0.7‡	2.5 ± 2.0
Peak speed ($km \cdot h^{-1}$)	24.1 ± 3.6	23.5 ± 3.2	23.3 ± 3.6	21.3 ± 2.7‡	25.8 ± 2.7
Physiological variables					
Percentage HRmax (%)	88.8 ± 5.9	88.4 ± 5.7	87.1 ± 5.1	86.7 ± 6.0	89.4 ± 4.8
Time >85% HRmax (%)	74.5 ± 31.2	72.1 ± 34.3	70.3 ± 29.6	64.4 ± 36.3	79.9 ± 23.8
Blood lactate ($mmol \cdot L^{-1}$)	8.9 ± 3.2*†	6.5 ± 3.0	6.0 ± 3.7	5.7 ± 3.3‡	8.2 ± 3.4
RPE (6–20)	17.4 ± 1.5*†	15.0 ± 1.8†	12.7 ± 2.5	13.7 ± 2.7‡	15.8 ± 2.2

*Significantly different from 6 vs. 6.
†Significantly different from 8 vs. 8.
‡Significantly different from Large, all $p < 0.05$.

Approche quantitative

Charge de Travail ⟷ Etat de Forme

- **Session RPE**

Durée Séance x Difficulté Séance (0-10) = Charge de Travail (A.U)

Foster et al (1996) Wis Med J.

Echelle	Description
0	Repos
1	Très facile
2	Facile
3	Modéré
4	Légèrement difficile
5	Difficile
6	
7	Très difficile
8	
9	
10	Similaire à ma compétition la plus difficile

Borg et al (1980).

- **Outil GPS**