

# El fútbol (ahora) es así

Texto de Felip Vivanco

La era del *big data* está revolucionando la trastienda del fútbol gracias a técnicos ávidos de controlar todo lo controlable en un deporte impredecible. A las puertas de la final de la Champions, ¿hasta qué punto los GPS, los cardiómetros y los programas de análisis ayudan al triunfo final en un juego en el que la suerte y el talento cuentan tanto?

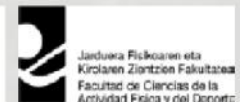
# Tecnologías low cost aplicadas al entrenamiento deportivo

David Casamichana Gómez

ENTIDADES ORGANIZADORAS



ENTIDADES COLABORADORAS



# La cuantificación del entrenamiento

## La cuantificación y la ciencias del deporte

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**SPORTS PHYSIOLOGY  
AND PERFORMANCE**  
[www.IJSPJ-Journal.com](http://www.IJSPJ-Journal.com)  
EDITORIAL

### The Alphabet of Sport Science Research Starts With Q

The training stimulus in competitive sports is usually described as a combination of training intensity, volume and frequency. It is generally believed that these three factors produce an adaptive response in the body that should lead to improved performance.  
1,p395

These were the introductory words of my first scientific publication as first author back in 1995. That study was primarily designed to describe a method for estimating

Pollock indicated in 1973 that “many investigators have reported their results without quantifying their training procedures, i.e., no mention of energy cost, heart rate intensity, miles covered, etc.”<sup>3,p157</sup> Along the same lines, Prof Will G. Hopkins indicated in his classic 1991 work on the quantification of training in competitive sports that, given that the links between training and outcomes such as performance and injury are so strong, it is surprising

**La cuantificación es la piedra angular de las ciencias del deporte**

**Para establecer relaciones causales entre lo que se hace y el resultado que se obtiene**

**Un estudio de intervención es inútil si no se ha realizado una cuantificación precisa**

# La cuantificación del entrenamiento

## Especialización dentro del cuerpo técnico



### Organisation of the professional team



**Manager**  
Roberto Mancini

#### TECHNICAL STAFF

**Staff of the manager**  
4 assistant  
1 fitness coach  
1 goalkeepers coach

#### SPORT SCIENCE UNIT

<b>1 Headchief of sport science</b>	<b>Medical unit</b>
1 strength fitness coach 1 prevention fitness coach 1 injury fitness coach	5 Physician 5 Massors 1 Nutritionist
<b>1 GPS/HR and workload analyst</b>	<b>Structure of collaboration</b> 1 exterior medical lab Sport science university
1 fitness coach for the EDS	
<b>Analysis performance</b>	
1 headchief of performance unit 2 opposition analysts 1 own team analyst 1 post match analyst	

Control de la carga física a la que ha sido expuesto cada deportista tanto en entrenamiento como en competición (Dvorak et al., 2000)

# La cuantificación del entrenamiento

Indicadores utilizados para evaluar la carga interna

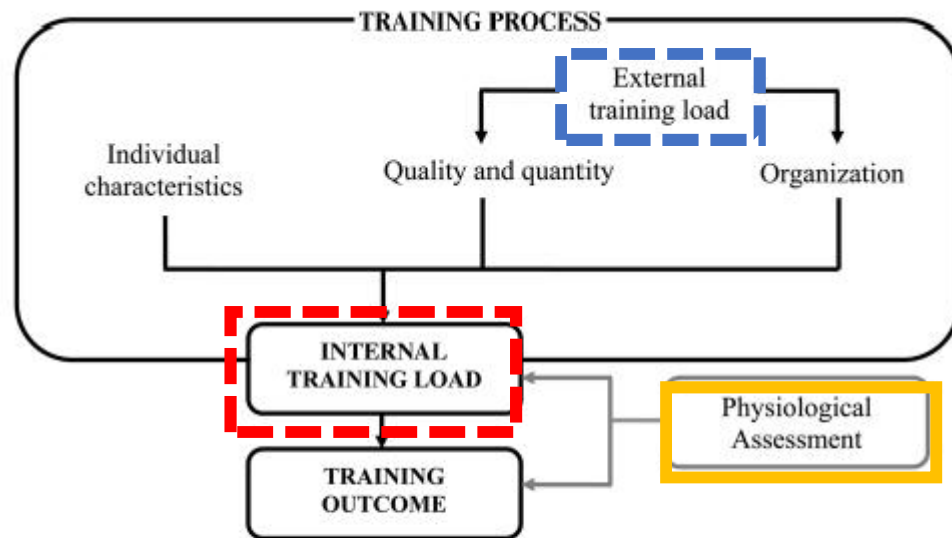


Figure 2. The training outcome is the consequence of the internal training load determined by (1) individual characteristics, such as genetic factors and previous training experience, and (2) the quality, quantity and organization of the external training load.

Frecuencia cardiaca

Lactato sanguíneo

Temperatura central y muscular

Depleción de glucógeno muscular

Consumo de oxígeno

# La cuantificación del entrenamiento

## Polar Team<sup>2</sup> Pro Set

Polar Team<sup>2</sup> Pro Set  
10 Team<sup>2</sup> Transmitters with Wearlink + straps and Charger,  
Team<sup>2</sup> Basestation with LAN and WLAN  
Team<sup>2</sup> Software for PC and PDA,  
Team<sup>2</sup> Tutorial  
USB dongle and carry case.

Basestation

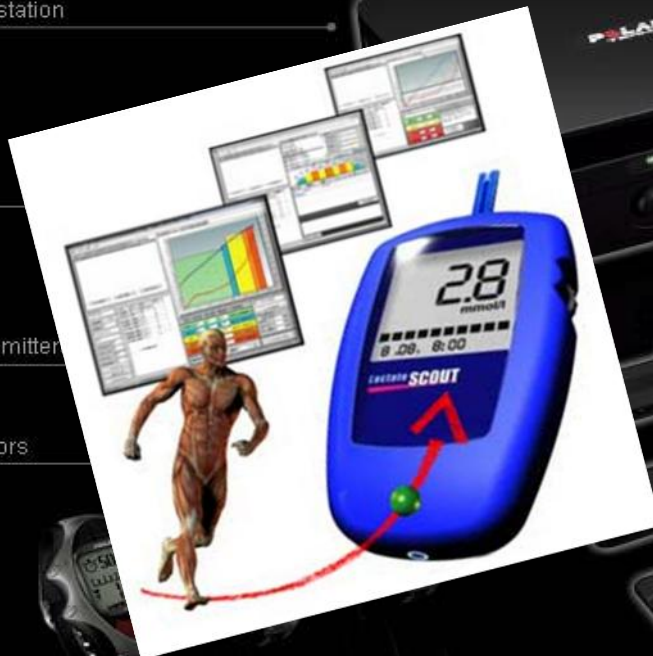
★

PDA

Transmitter

★

Monitors



Laptop

SW and Tutorial CD

★

USB dongle

★

Charger

★



Included in the Polar Team<sup>2</sup> Pro Set ★

# La cuantificación del entrenamiento

## La carga externa

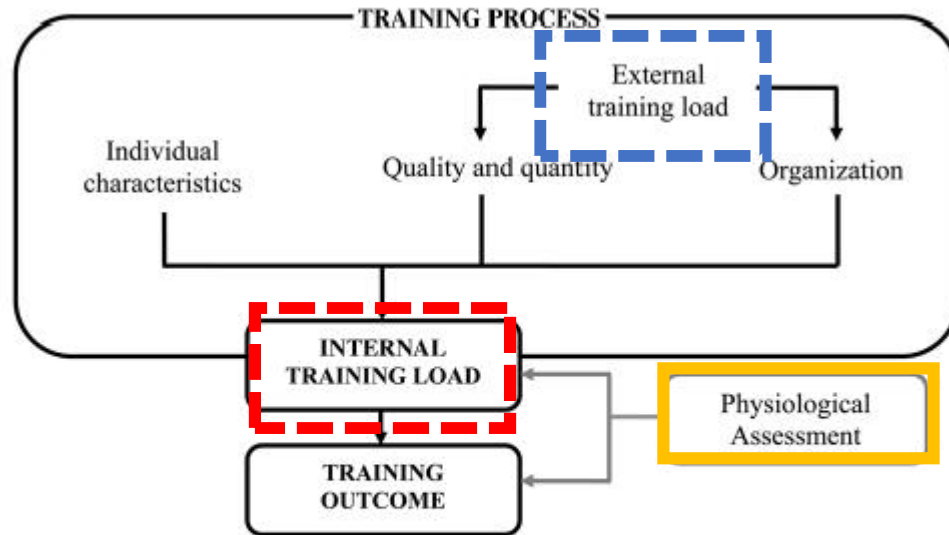
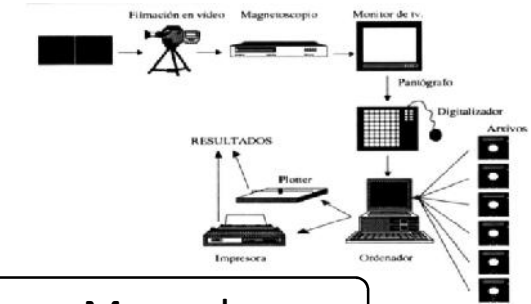


Figure 2. The training outcome is the consequence of the internal training load determined by (1) individual characteristics, such as genetic factors and previous training experience, and (2) the quality, quantity and organization of the external training load.

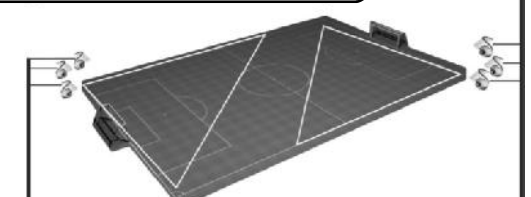
- Método útil para conocer demandas de la competición (Reilly y Thomas, 1976)
- Amplio abanico de técnicas de registro atendiendo a diferentes criterios (Barris y Button, 2008)

Impellizzeri, FM., Rampinini, E., y Marcora, S.M. (2005). Physiological assessment of aerobic training in soccer. *Journal of Sports Sciences*, 23(6), 583-592

## Técnicas de monitorización de carga externa



Manual



Semiatomático



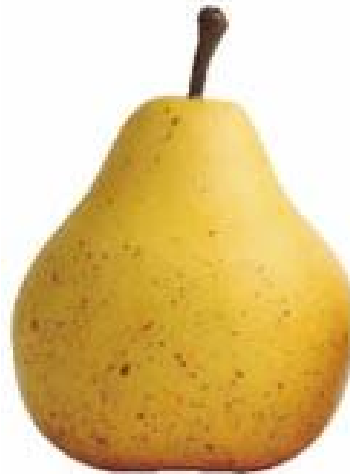
Automático

Criterio: "intervención humana"

# La cuantificación del entrenamiento

Carga = Volumen x Intensidad

UA =



x



REVIEW ARTICLE

Sports Med 2009; 39 (9): 779-795  
0112-1642/09/0009-0779/\$49.95/0

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## The Quantification of Training Load, the Training Response and the Effect on Performance

Jill Borresen and Michael Ian Lambert

MRC/UCT Research Unit for Exercise Science and Sports Medicine, Department of Human Biology, University of Cape Town, Cape Town, South Africa

1. Quantifying Training	.....
1.1 Questionnaires and Diaries	.....
1.2 Physiological Measures	.....
1.2.1 Heart Rate	.....
1.2.2 Oxygen Consumption	.....
1.2.3 Lactate	.....
1.2.4 Rating of Perceived Exertion (RPE)	.....
1.2.5 Critical Power	.....
1.3 Direct Observation	.....
1.4 Indices of Training Stress	.....
1.4.1 Training Impulse (TRIMP)	.....
1.4.2 Session RPE	.....
1.4.3 Summated Heart Rate Zone Score	.....
1.4.4 Lucia's TRIMP	.....

Propuesta de 0 euros

# La cuantificación del entrenamiento

## *Percepción subjetiva del esfuerzo*

¿Cómo perciben nuestros jugadores que son las tareas/entrenamiento?

¿Cómo de intenso ha resultado el entrenamiento?

Carga = volumen \* intensidad = X

Carga = minutos sesión \* valor escala de PSE = X

Escala	Descripción
0	Recuperación
1	Sumamente fácil
2	Fácil
3	Moderado
4	Algo duro
5	Duro
6	
7	Muy duro
8	
9	
10	Máximo



# Valoración del esfuerzo percibido

¿Esta medida me indica algo?  
¿es válida?



## RELATIONSHIP BETWEEN INDICATORS OF TRAINING LOAD IN SOCCER PLAYERS

DAVID CASAMICHANA,<sup>1</sup> JULEN CASTELLANO,<sup>1</sup> JULIO CALLEJA-GONZALEZ,<sup>1</sup> JAIME SAN ROMÁN,<sup>1</sup> AND CARLO CASTAGNA<sup>2</sup>

<sup>1</sup>Faculty of Physical Activity and Sport Sciences, University of the Basque Country (EHU/UPV), Vitoria-Gasteiz, Spain; and <sup>2</sup>Football Training and Biomechanics Laboratory, Italian Football Federation (FIGC), Technical Department, Coverciano (Florence), Italy

### INTRODUCTION

To develop physical fitness and team skills, an extensive use of group training (i.e., specific training) drills is considered in soccer (13). Specific training in soccer assumes the form of small-sided games using different number of players, pitch dimensions, and game rules to promote the requested adaptations (21). Team-skill training load (TL) quantification is of importance when the objective is to evaluate magnitude compliance between planned and performed training drills. This enables TL to be modulated according to seasonal training aims. This assumes value as efficient training prescription is work load dependent (29).

In soccer, the individual training response (internal load) to a given imposed training program (external load) may result in being different among players, and consequently, individualization may result...

International Journal of Sports Physiology and Performance, 2008, 3, 320-330  
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## A Comparison of Methods Used for Quantifying Internal Training Load in Women Soccer Players

Helen Alexiou and Aaron J. Coutts

**Purpose:** The purpose of this study was to compare the quantifying internal training load (TL) with various HR methods in a variety of training modes with women soccer players. **Methods:** In total, 10 elite women soccer players took part in the study (age: 19.1 ± 2.7 mL·kg<sup>-1</sup>·min<sup>-1</sup>). Session-RPE, heart rate, and duration of individual training sessions and matches over a period of 16 weeks were used to compare session-RPE TLs with three commonly used methods for assessing TL. **Results:** The mean correlation for session TRIMP, TL<sub>HR</sub>, TL<sub>HRmax</sub>, and Edwards's TL were ( $r = 0.84, 0.83, 0.81$ , respectively). Correlations for session-RPE TL and three TLs rated by session type were all significant (all  $P < .05$ ). The strongest correlations were reported for technical ( $r = 0.68$  to  $0.82$ ), conditioning ( $r = 0.61$  to  $0.79$ ). **Conclusion:** The session-RPE TL correlated with all training types common to soccer. Higher correlations with all training types common to soccer suggest that session-RPE TLs in less intermittent training support previous findings showing that the session RPE TL or HR-based methods for quantifying internal TL in a variety of training modes.

**Keywords:** session-RPE, heart rate, soccer training, periodization

To optimize athletic performance, physical training should be tailored to each athlete's individual characteristics. However, in team sports, training sessions are often conducted in a group, which means that all players are receiving specific training based on their individual characteristics. Hoff et al.<sup>2</sup> demonstrated that soccer players with inferior fitness levels did not receive sufficient training stimulus to further improve their fitness when training in a team environment using small-sided games. It has been suggested that players with inferior fitness levels may

The authors are with the School of Leisure, Sport, and Tourism, University of Western Australia.

### ORIGINAL INVESTIGATIONS

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## Quantifying Training Load: A Comparison of Subjective and Objective Methods

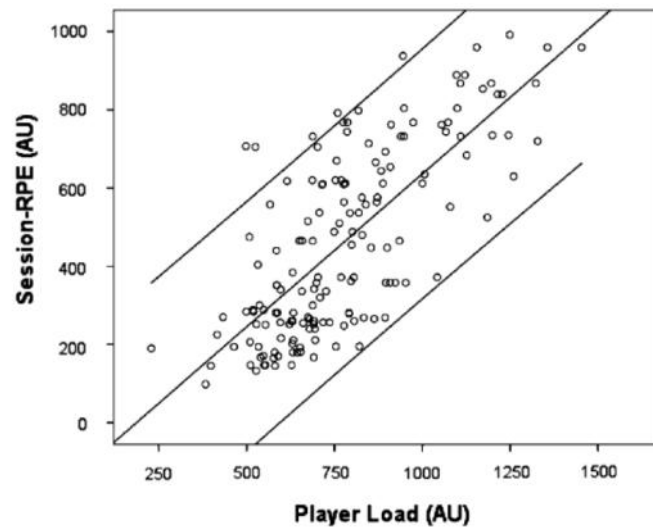
Jill Borresen and Michael I. Lambert

**Purpose:** To establish the relationship between a subjective (session rating of perceived exertion [RPE]) and 2 objective (training impulse [TRIMP]) and summated heart-rate-zone (SHRZ) methods of quantifying training load and explain characteristics of the variance not accounted for in these relationships. **Methods:** Thirty-three participants trained ad libitum for 2 wk, and their heart rate (HR) and RPE were recorded to calculate training load. Subjects were divided into groups based on whether the regression equations over- (OVER), under- (UNDER), or accurately predicted (ACCURATE) the relationship between objective and subjective methods. **Results:** A correlation of  $r = .76$  (95% CI: .56 to .88) occurred between TRIMP and session-RPE training load. OVER spent a greater percentage of training time in zone 4 of SHRZ (ie, 80% to 90% HRmax) than UNDER (46% ± 8% vs 25% ± 10% [mean ± SD],  $P = .008$ ). UNDER spent a greater percentage of training time in zone 1 of SHRZ (ie, 50% to 60% HRmax) than OVER (15% ± 8% vs 3% ± 3%,  $P = .005$ ) and ACCURATE (5% ± 3%,  $P = .020$ ) and more time in zone 2 of SHRZ (ie, 60% to 70% HRmax) than OVER (17% ± 6% vs 7% ± 6%,  $P = .039$ ). A correlation of  $r = .84$  (.70 to .92) occurred between SHRZ and session-RPE training load. OVER spent proportionally more time in Zone 4 than UNDER (45% ± 8% vs 25% ± 10%,  $P = .018$ ). UNDER had a lower training HR than ACCURATE (132 ± 10 vs 148 ± 12 beats/min,  $P = .048$ ) and spent more time in zone 1 than OVER (15% ± 8% vs 4% ± 3%,  $P = .013$ ) and ACCURATE (5% ± 3%,  $P = .015$ ). **Conclusions:** The session-RPE method provides reasonable estimates of training load compared with HR-based methods.

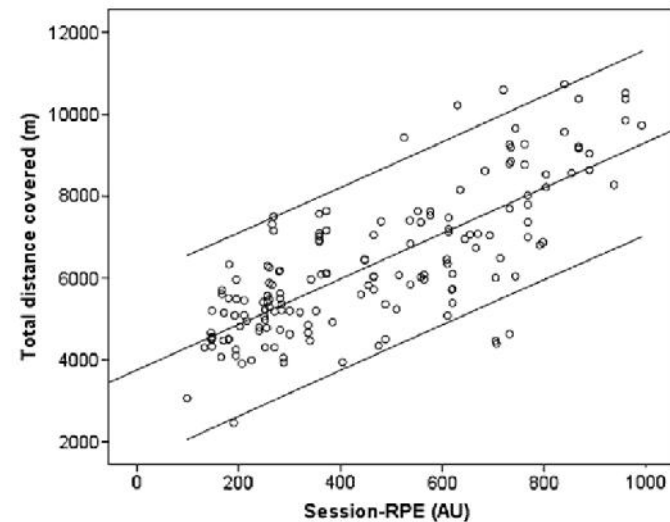
# Valoración del esfuerzo percibido



VS.



**Figure 4.** Relationship between player load (determined by accelerometry) and the session-rating of perceived exertion indicator for the 210 recordings made ( $r = 0.74$ ;  $p < 0.01$ ). "AU" is arbitrary unit.

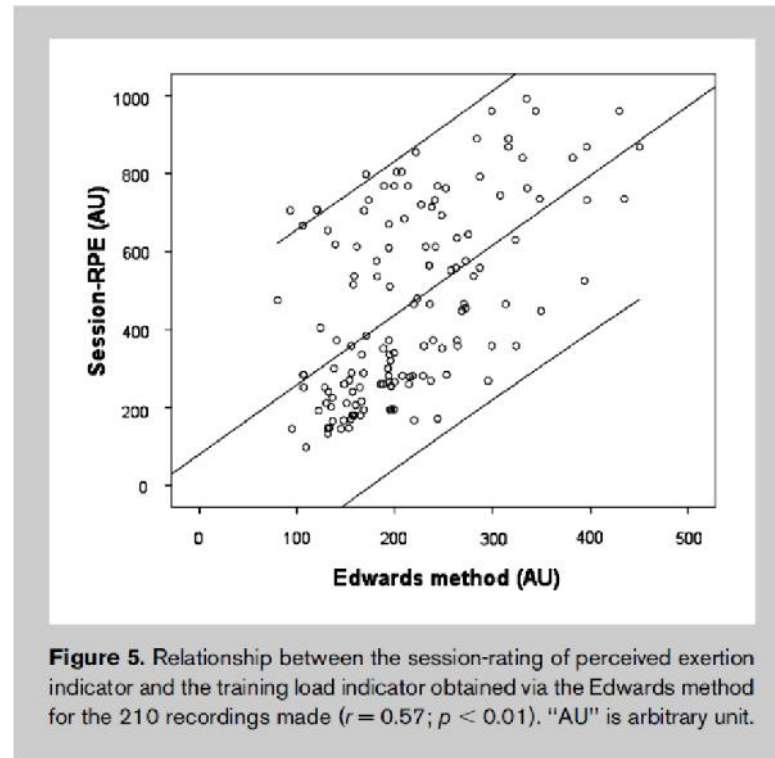


**Figure 3.** Relationship between the session-rating of perceived exertion indicator and the total distance covered for the 210 recordings made ( $r = 0.76$ ;  $p < 0.01$ ). "AU" is arbitrary unit.

# Valoración del esfuerzo percibido

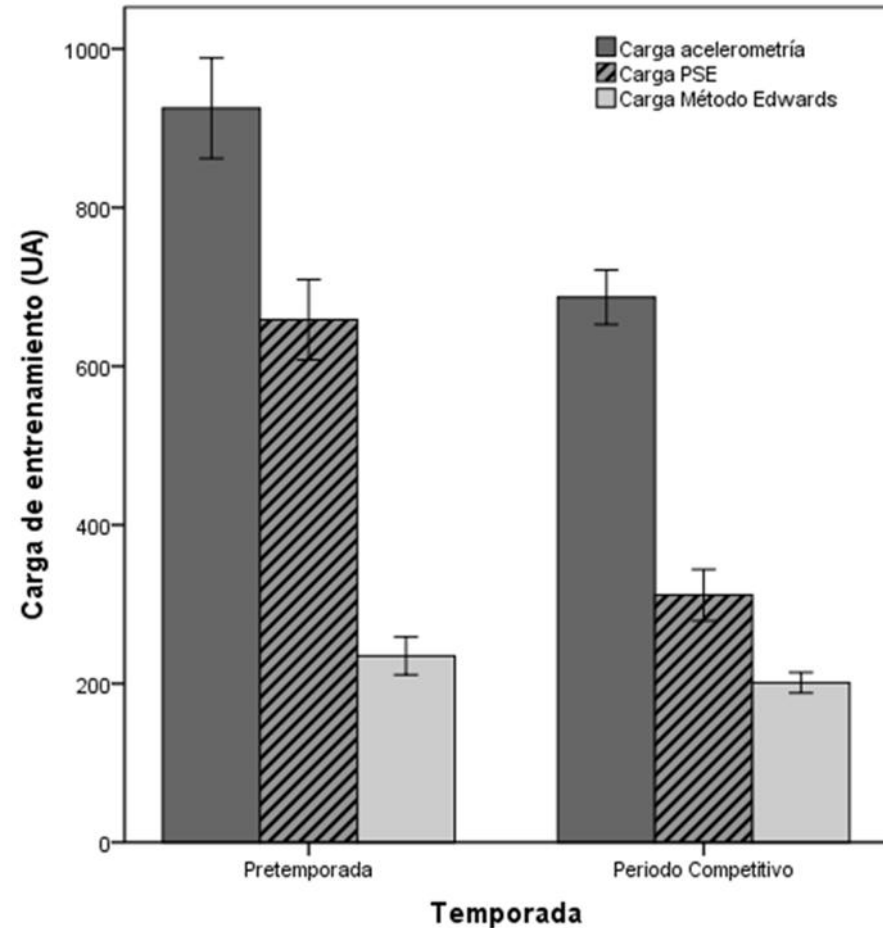
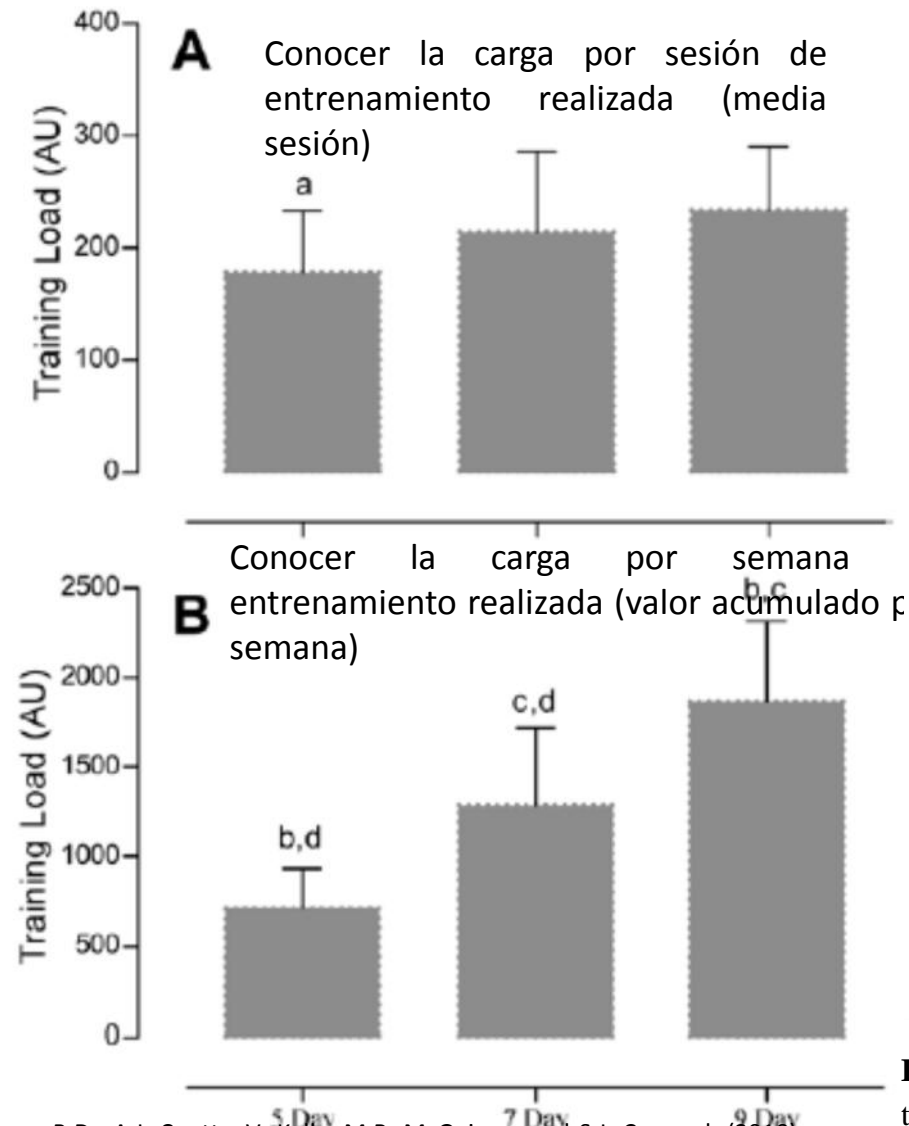


VS.



Casamichana et al. (2013)

# Valoración del esfuerzo percibido



**Figura 2.** Carga media de sesión durante la pretemporada y durante la temporada obtenida a través de acelerometría, a través del método sesión-PSE y a través del método Edwards con monitorización de frecuencia cardíaca (Casamichana y Castellano, datos sin publicar).

# Aspectos a tener en cuenta...

- Momento estandarizado de utilización (30 minutos después de finalizar)
- Decidir si contabilizar tiempo bruto o neto de sesión
- Decidir si incluir o no calentamiento (especialmente en partido, porque sobreestimaremos; Comyns et al., 2013)



# CONSISTENCIA

# La cuantificación del entrenamiento

## Carga (UA) basada en el método Sesión RPE



# La cuantificación del entrenamiento

## Carga (UA) basada en el método Sesión RPE

### Percepción subjetiva del esfuerzo

¿Cómo perciben nuestros jugadores que son las tareas/entrenamiento?

¿Cómo de intenso a resultado el entrenamiento?

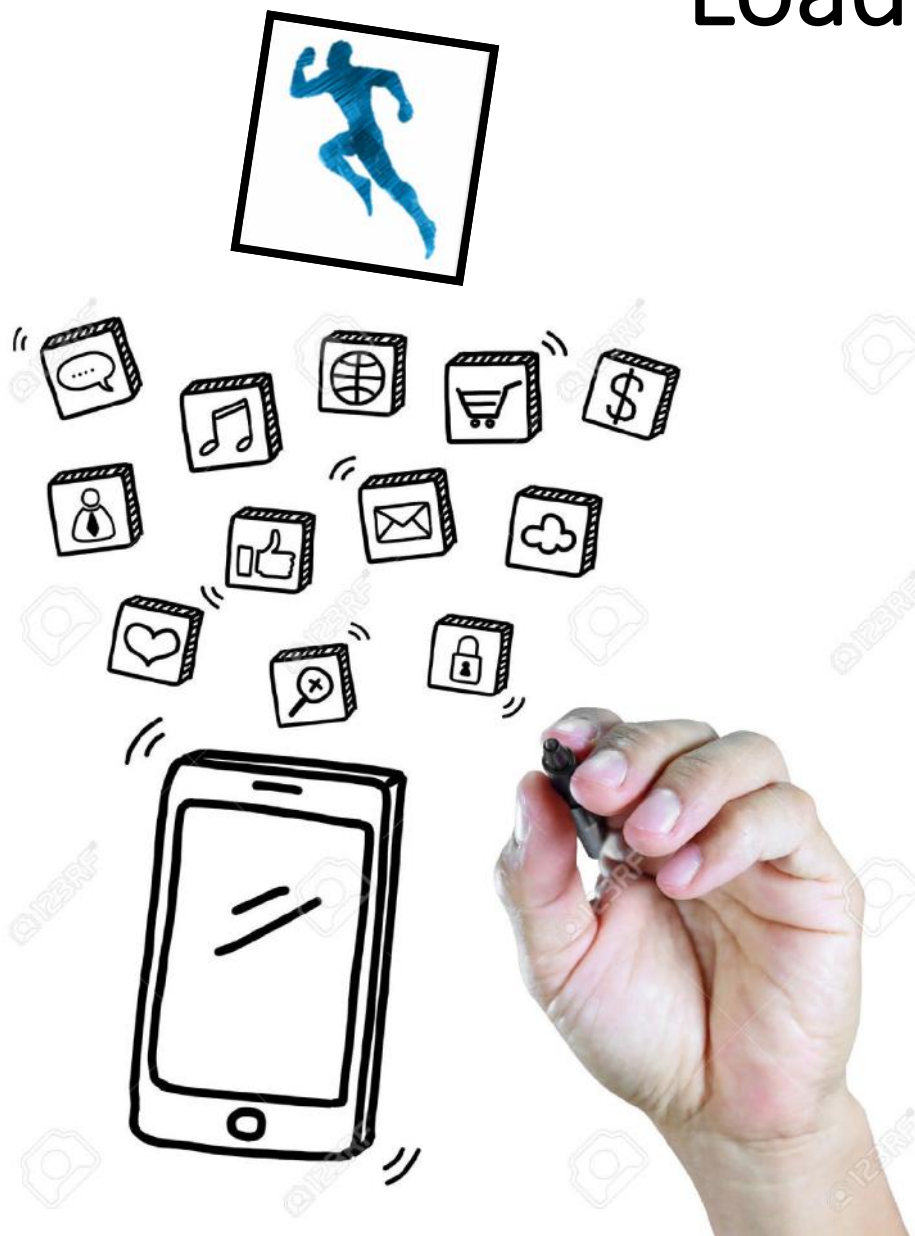
Carga = volumen \* intensidad = X

Carga = minutos sesión \* valor escala de PSE = X

Escala	Descripción
0	Recuperación
1	Sumamente fácil
2	Fácil
3	Moderado
4	Algo duro
5	Duro
6	
7	Muy duro
8	
9	
10	Máximo

# Loadness

## Descripción



Controla la carga interna de entrenamiento de tus deportistas de forma rápida y cómoda.

Tus deportistas rellenarán un Test de Valoración del Estado de Bienestar y un Test de Valoración del esfuerzo percibido: Borg, y simplemente pulsando un botón, recibirás todos los datos de los test rellenos en un documento excel, a través de un correo electrónico.



# Loadness



Loadness Trainer

Loadness Athlete

Pepe Perez

Tests

Nombre

Pepe Perez

Email

Pepepe@gmail.com

Nuevo Password

Password

Repetir password

Actualizar

Volver

Pepe Perez

Email

Password

Entrar

Olvidé mi password

Pepe Perez

Tests

2014-10-19

Valoración del Estado de Bienestar (+)

Valoración del Esfuerzo Percibido: Borg (+)

# Loadness Athlete



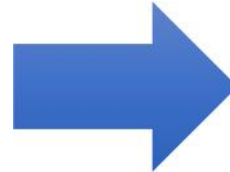
Pepe Perez

Tests

2014-10-19

Valoración del Estado de Bienestar

Valoración del Esfuerzo Percibido: Borg



Pepe Perez

Tests

FATIGA

1	Cansado Siempre	<input type="radio"/>
1.5		<input type="radio"/>
2	Muy Cansado	<input type="radio"/>
2.5		<input checked="" type="radio"/>
3	Normal	<input type="radio"/>
3.5		<input type="radio"/>
4	Fresco	<input type="radio"/>
4.5		<input type="radio"/>
5	Muy fresco	<input type="radio"/>

CALIDAD DEL SUEÑO

1	Insomnio	<input type="radio"/>
1.5		<input type="radio"/>
2	Sueño inquieto	<input checked="" type="radio"/>
2.5		<input type="radio"/>

# Loadness Athlete



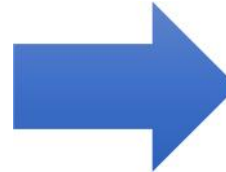
Pepe Perez

Tests

2014-10-19

Valoración del Estado de Bienestar

Valoración del Esfuerzo Percibido: Borg



Pepe Perez

Tests

0	Nada en absoluto	<input type="radio"/>
0.5		<input type="radio"/>
1	Muy ligero	<input type="radio"/>
2		<input type="radio"/>
3	Ligero	<input type="radio"/>
4	Moderado	<input type="radio"/>
5	Algo duro	<input type="radio"/>
6	Duro	<input type="radio"/>
7		<input type="radio"/>
8	Muy duro	<input type="radio"/>
9		<input type="radio"/>
10	Extremadamente duro	<input type="radio"/>

# Loadness Trainer



The image displays three sequential screenshots of a mobile application interface for 'loadness.test@gmail.com'. The top status bar shows 3G/H+ connectivity, 4% battery, and the time 23:09. The app has a hamburger menu icon in the top right corner.

**Screenshot 1 (Left):** The 'Deportistas' tab is active. A date input field contains '2014-10-18'. Below it is a blue 'Enviar Excel' button. At the bottom is an orange 'Enviar Notificación' button.

**Screenshot 2 (Middle):** The 'Deportistas' tab is active. A grey 'Nuevo Deportista' button is at the top. Below it is a list of athletes, each with a red 'X' icon to its right:

Pepe Perez	⊗
Roberto Lopez	⊗
Francisco Fernandez	⊗

**Screenshot 3 (Right):** The 'Nuevo Deportista' form is shown. It includes the following fields and buttons:

- Nombre:
- Email:
- Password:
- Repetir password:
- Crear:



# Valoración del estado de bienestar

	5	4	3	2	1
Fatiga	muy fresco	fresco	normal	más cansado de lo normal	siempre cansado
Calidad del sueño	muy tranquilo	bueno	dificultad para caer dormido	sueño inquieto	insomnio
Dolor muscular general	sentirse muy bien	sentirse bien	normal	incremento en el dolor/tirantez	muy dolorido
Niveles de stress	muy relajado	relajado	normal	sentimiento de estress	altamente estresado
Humor	humor muy positivo	generalmente buen humor	menos interés en otros y/o en otras actividad de los normal		altamente irritable

# Valoración del estado de bienestar



## PHYSIOLOGICAL RESPONSES TO AN INTENSIFIED PERIOD OF RUGBY LEAGUE COMPETITION

RICH D. JOHNSTON,<sup>1,2</sup> NEIL V. GIBSON,<sup>2,3</sup> CRAIG TWIST,<sup>4</sup> TIM J. GABBETT,<sup>1</sup> SOPHIE A. MACNAY,<sup>4</sup> AND NIALL G. MACFARLANE<sup>5</sup>

<sup>1</sup>School of Exercise Science, Australian Catholic University, Brisbane, Australia; <sup>2</sup>Scotland Rugby League, Edinburgh, United Kingdom; <sup>3</sup>Center for Sport and Exercise, Heriot-Watt University, Edinburgh, United Kingdom; <sup>4</sup>Department of Sport and Exercise Sciences, University of Chester, Chester, United Kingdom; and <sup>5</sup>School of Life Sciences, University of Glasgow, Glasgow, United Kingdom

### ABSTRACT

Johnston, RD, Gibson, NV, Twist, C, Gabbett, TJ, MacNay, SA, and MacFarlane, NG. Physiological responses to an intensified period of rugby league competition. *J Strength Cond Res* 27(3): 643–654, 2013—This study investigated the physiological responses to an intensified period of rugby league competition and the subsequent impact on match performance. The participants were 7 rugby league players competing in an international student tournament. The tournament involved three 80-minute games over a 5-day period, with 48 hours between each match. Baseline measures of upper and lower body neuromuscular functions via a plyometric press-up (PP) and countermovement jump (CMJ), respectively (peak power and peak force were measured), blood creatine kinase (CK), and perceptions of well-being were assessed with a questionnaire. These measures were repeated every morning of the competition; neuromuscular fatigue and CK were additionally assessed within 2 hours after the cessation of each game. During each match, player movements

accumulate. This cumulative fatigue may compromise high-intensity match activities such as high-speed running, accelerations, and tackling. Furthermore, CMJs and PPs appear to be sensitive measures for monitoring neuromuscular function in rugby league players.

**KEY WORDS** neuromuscular fatigue, muscle damage, recovery, contact sport, match performance

### INTRODUCTION

Rugby league is a contact team sport that is intermittent in nature, with periods of high-intensity activity (e.g., high-speed running, sprinting, and physical collisions) and low-intensity recovery (e.g., standing, walking, and jogging) performed over two 40-minute halves. Depending on playing position, players cover distances in the range of 3,000–8,000 m during a match (27,33,43). Over the course of a rugby league season, players are required to compete on a weekly basis over a 7- to

TABLE 1. Fatigue monitoring protocol during the week-long intensified competition.\*

Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
AM 08.00–10.00	CK CMJ and PP Fatigue questionnaire	CK CMJ and PP Fatigue questionnaire	CK CMJ and PP Fatigue questionnaire	CK CMJ and PP Fatigue questionnaire	CK CMJ and PP Fatigue questionnaire	CK CMJ and PP Fatigue questionnaire
PM 19.00–21.00		Game 1		Game 2		Game 3
22.00–23.00		CK CMJ and PP		CK CMJ and PP		CK CMJ and PP

\*CK = creatine kinase; CMJ = countermovement jump; PP = plyometric press-up.

# Valoración del estado de bienestar

Reducción significativa a las 12 horas después de cada partido



Aumento significativo a las 12 horas después de cada partido

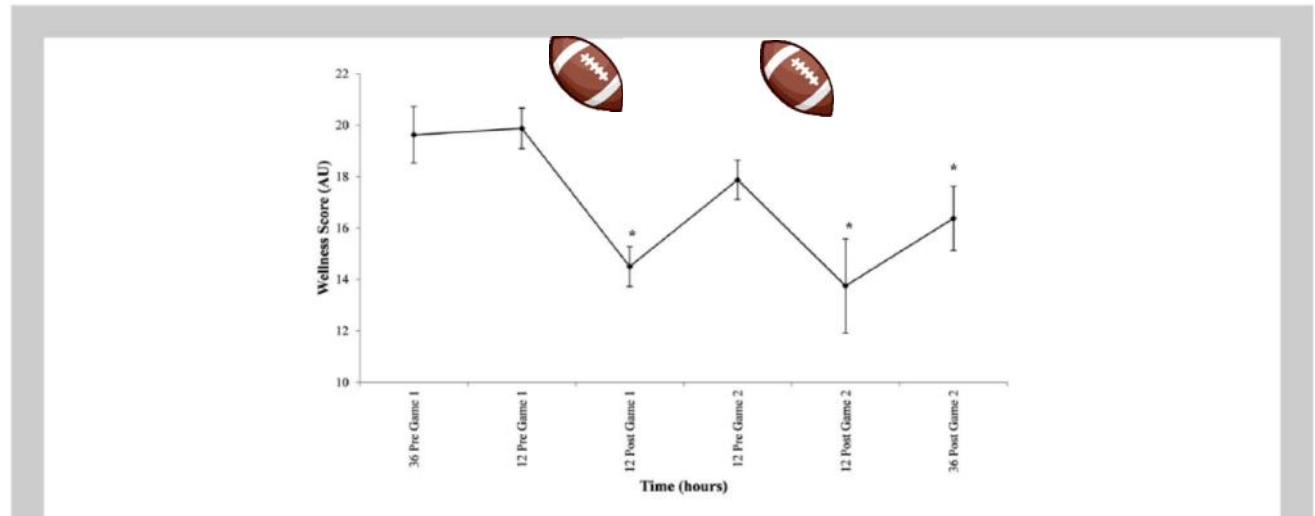


Figure 6. Perceived well-being scores for each time period during the week-long intensified competition. \*A significant difference ( $p < 0.05$ ) to baseline. Data are presented as mean  $\pm$  SE.

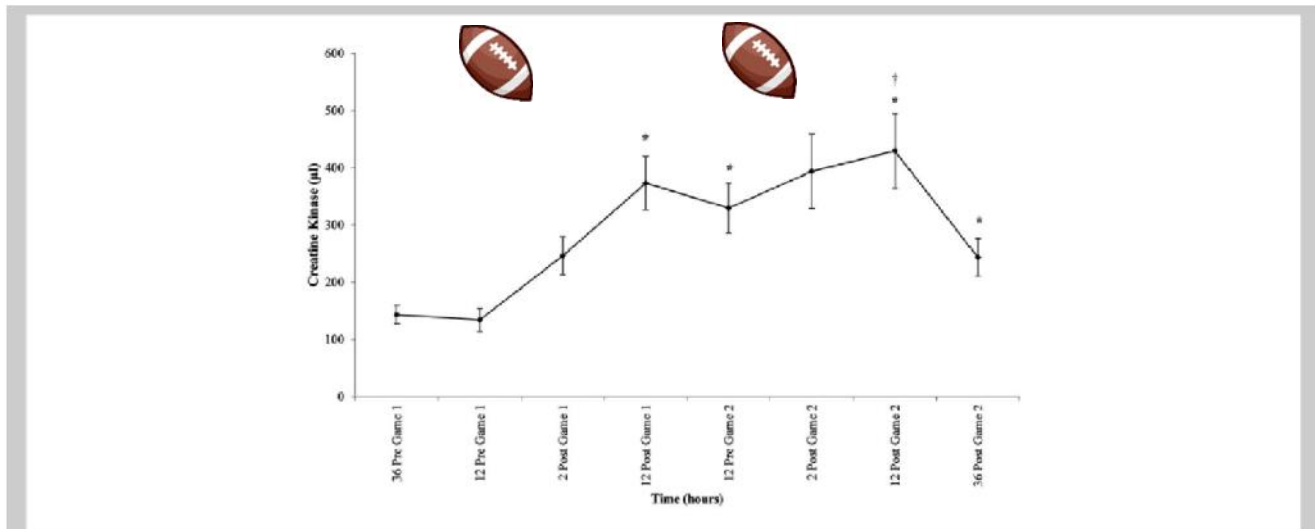


Figure 5. Whole-blood creatine kinase activity at each time period during the week-long intensified competition. \*A significant difference ( $p < 0.05$ ) to baseline; †A significant difference ( $p < 0.05$ ) to 12 hours pregame 2 and 36 hours postgame 2. Data are presented as mean  $\pm$  SE.



# Valoración del estado de bienestar

**Table 1** General description of training content and daily training load (in arbitrary units; mean  $\pm$  SD) during each of the microcycles

Microcycle and Time	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
Five Days										
AM		Recovery		Skills/ Strength						
PM	Match				Skills	Match				
Training load:	421 $\pm$ 173	118 $\pm$ 24	—	395 $\pm$ 81	244 $\pm$ 55	475 $\pm$ 196				
Seven Days										
AM		Recovery	Skills/ Weights	Skills/Contact/ Conditioning		Speed/ Skills	Skills			
PM	Match					Weights		Match		
Training load:	411 $\pm$ 213	94 $\pm$ 15	388 $\pm$ 163	389 $\pm$ 180	—	386 $\pm$ 107	151 $\pm$ 1	412 $\pm$ 196		
Nine Days										
AM		Recovery			Weights/ Skills	Conditioning/ Contact		Speed/ Weights	Skills	
PM	Match							Skills		Match
Training load:	411 $\pm$ 217	96 $\pm$ 15	—	—	733 $\pm$ 118	478 $\pm$ 271	—	539 $\pm$ 77	166 $\pm$ 33	437 $\pm$ 172

*International Journal of Sports Physiology and Performance*, 2010, 5, 367-383  
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## Neuromuscular, Endocrine, and Perceptual Fatigue Responses During Different Length Between-Match Microcycles in Professional Rugby League Players

Blake D. McLean, Aaron J. Coutts, Vince Kelly,  
Michael R. McGuigan, and Stuart J. Cormack

**Introduction:** The purpose of this study was to examine the changes in neuromuscular, perceptual and hormonal measures following professional rugby league matches during different length between-match microcycles. **Methods:** Twelve professional rugby league players from the same team were assessed for changes in countermovement jump (CMJ) performance (flight time and relative power), perceptual responses (fatigue, well-being and muscle soreness) and salivary hormone (testosterone [T] and cortisol [C]) levels during 5, 7 and 9 d between-match training microcycles. All training was prescribed by the club coaches and was monitored using the session-RPE method. **Results:** Lower mean daily training load was completed on the 5 d compared with the 7 and 9 d microcycles. CMJ flight time and relative power, perception of fatigue, overall well-being and muscle soreness were significantly reduced in the 48 h following the match in each microcycle ( $P < .05$ ). Most CMJ variables returned to near baseline values following 4 d in each microcycle. Countermovement jump relative power was lower in the 7 d microcycle in comparison with the 9 d microcycle ( $P < .05$ ). There was increased fatigue at 48 h in the 7 and 9 d microcycles ( $P < .05$ ) but had returned to baseline in the 5 d microcycle. Salivary T and C did not change in response to the match. **Discussion:** Neuromuscular performance and perception of fatigue are reduced for at least 48 h following a rugby league match but can be recovered to baseline levels within 4 d. These findings show that with appropriate training, it is possible to recover neuromuscular and perceptual measures within 4 d after a rugby league match.

**Keywords:** neuromuscular fatigue, testosterone, cortisol, team sport, monitoring

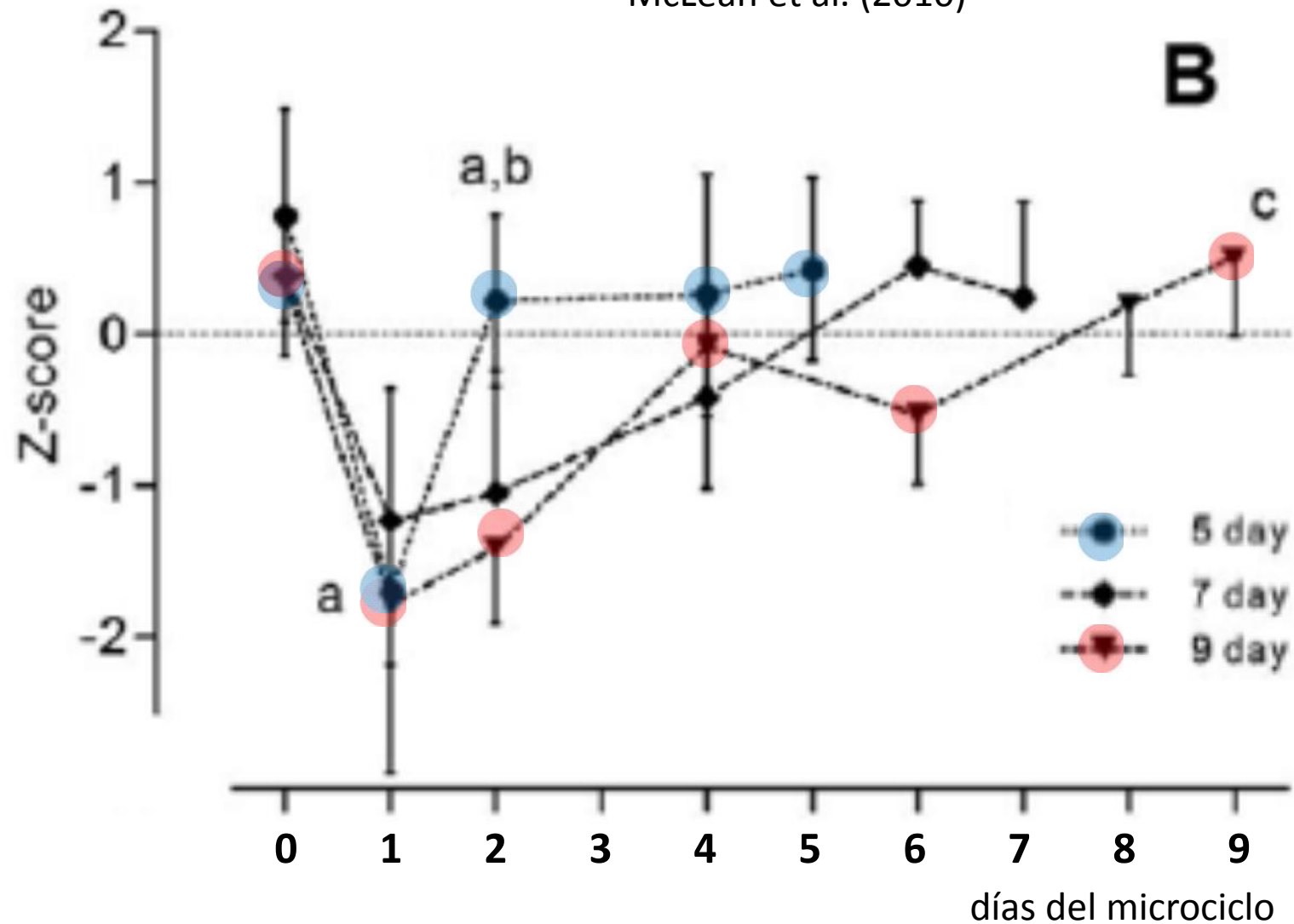
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	5	4	3	2	1	Record Score
<b>FATIGUE</b>	Very fresh	Fresh	Normal	More tired than normal	Always tired	
<b>SLEEP QUALITY</b>	Very restful	Good	Difficulty falling asleep	Restless sleep	Insomnia	
<b>GENERAL MUSCLE SORENESS</b>	Feeling great	Feeling good	Normal	Increase in soreness/tightness	Very sore	
<b>STRESS LEVELS</b>	Very relaxed	Relaxed	Normal	Feeling stressed	Highly stressed	
<b>MOOD</b>	Very positive mood	A generally good mood	Less interested in others &/or activities than usual	Snapiness at teammates, family and co-workers	Highly annoyed/irritable/down	

**Figure 1** — The well-being review sheet that was completed during the study.

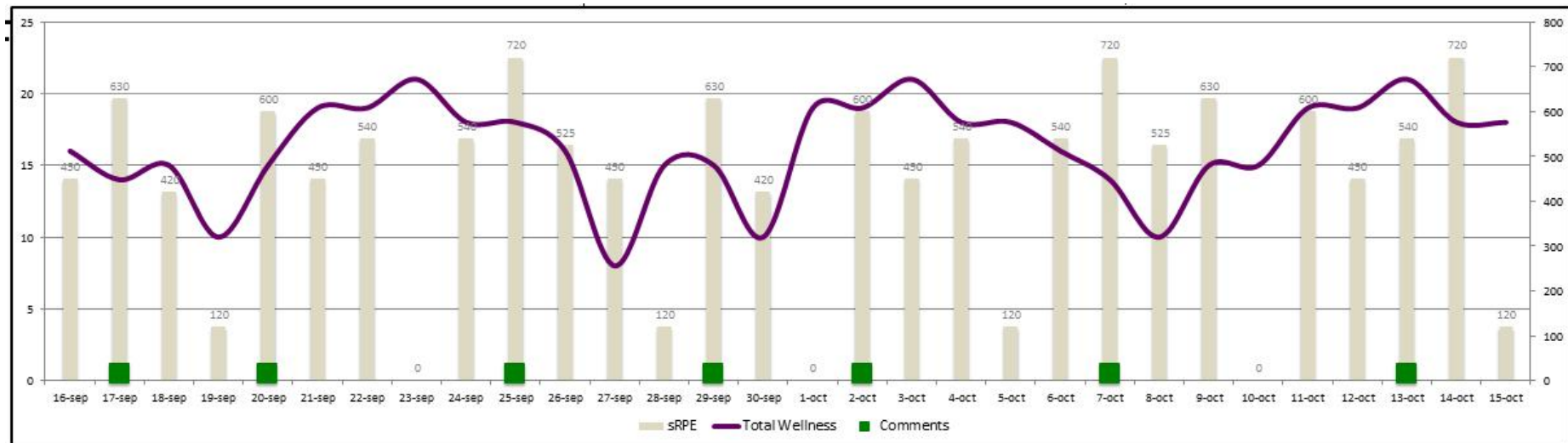
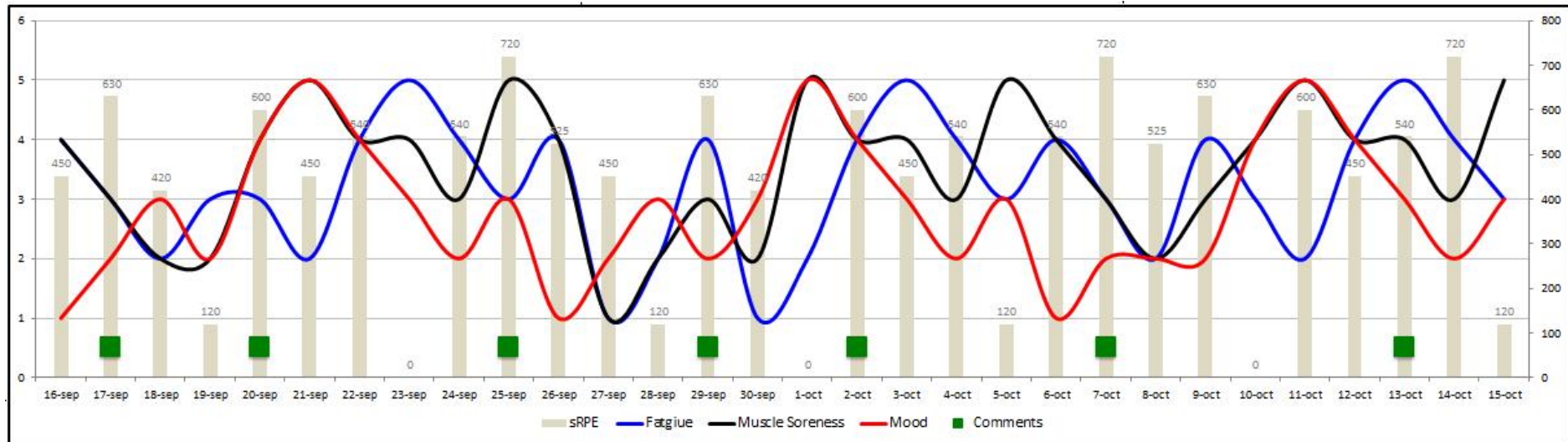
# Valoración del estado de bienestar

McLean et al. (2010)



# Pregunta final....

Si las escalas de intensidad son útiles, ¿por qué nos las utilizamos?



# El fútbol (ahora) es así

Texto de Felipe Vivanco

La era del *big data* está revolucionando la trastienda del fútbol gracias a técnicos ávidos de controlar todo lo controlable en un deporte impredecible. A las puertas de la final de la Champions, ¿hasta qué punto los GPS, los cardiómetros y los programas de análisis ayudan al triunfo final en un juego en el que la suerte y el talento cuentan tanto?

## MUCHAS GRACIAS POR VUESTRA ATENCIÓN



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